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Rock Products

and

CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

SPEED, THE CHIEF REQUISITE

THE ENACTMENT of the $4,880,000,000 public works bill assures two years of fairly active construction activity if the funds can be put to work immediately.

THE ASSURANCE of the President that construction activities will be conducted and supervised by existing governmental agencies is helpful.

THE EXPRESSED PURPOSE to spend much of the money in the more densely populated sections means that more commercial construction materials will be required than has been the case heretofore.

ABOUT $1,500,000,000 is the estimate required for highway construction and grade crossing elimination—including state highway funds required to match regular federal aid appropriations.

A GREAT DEAL of the highway construction can go forward immediately, and doubtless much of it will be spent for widening existing highways. Many cities have put in applications for extensive street paving and new boulevards.

THE COOPERATION of everyone concerned will be needed to expedite grade crossing eliminations because these generally involve land condemnation proceedings which may be lengthy.

ALL GOOD CITIZENS recognize the need of grade crossing elimination and producers of rock products could well afford to help organize local committees to assist in molding public sentiment so that delays may be avoided.

THERE ARE, doubtless, many other ways producers may help to speed up this construction program; there are certainly many ways they can help to see that the money is spent to the best possible advantage under the circumstances.

THIS IS as much their responsibility as anybody's, for while they may get some business now, they are among those who must ultimately foot the bill.

THE EDITOR ~ ~ ~

Raymond Roller Kiln Mill

equipped with WHIZZER SEPARATOR

Roller Kiln Mill for drying, grinding and separating in one simultaneous operation.

THIS combination unit enables you to grind and dry your product in one operation and provides instant fineness control, from about 80% passing 100-mesh to 99.95% passing 325-mesh, simply by changing the speed of whizzer.

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Division of Combustion Engineering Co., Inc.
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Sales Offices in New York and Los Angeles
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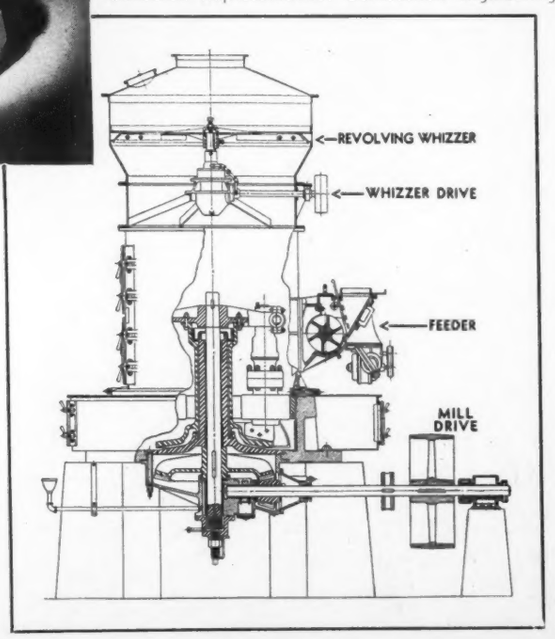

Cross-section showing whizzer device mounted on vertical shaft in separating chamber above mill. Changing whizzer speed through a variable transmission regulates classification of product.

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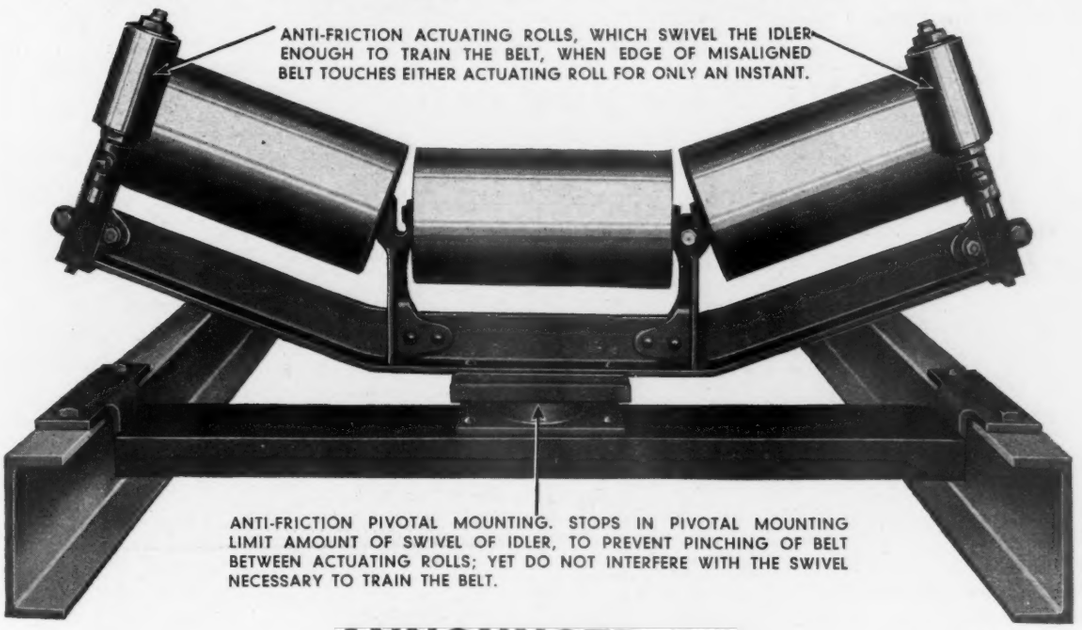
Self-Aligning Idler
for Troughed Conveyor Belts


ANTI-FRICTION ACTUATING ROLLS, WHICH SWIVEL THE IDLER ENOUGH TO TRAIN THE BELT, WHEN EDGE OF MISALIGNED BELT TOUCHES EITHER ACTUATING ROLL FOR ONLY AN INSTANT.
ANTI-FRICTION PIVOTAL MOUNTING. STOPS IN PIVOTAL MOUNTING LIMIT AMOUNT OF SWIVEL OF IDLER, TO PREVENT PINCHING OF BELT BETWEEN ACTUATING ROLLS; YET DO NOT INTERFERE WITH THE SWIVEL NECESSARY TO TRAIN THE BELT.

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May, 1935

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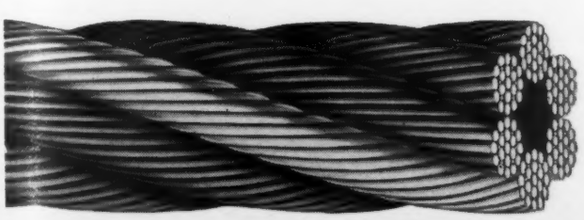

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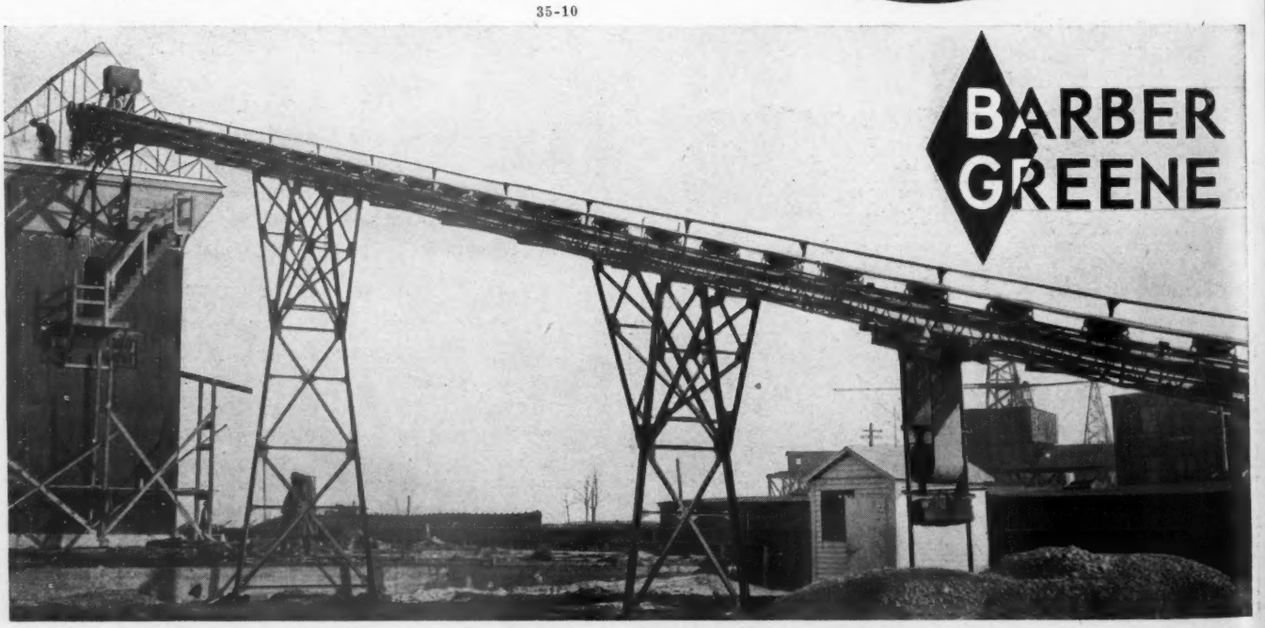

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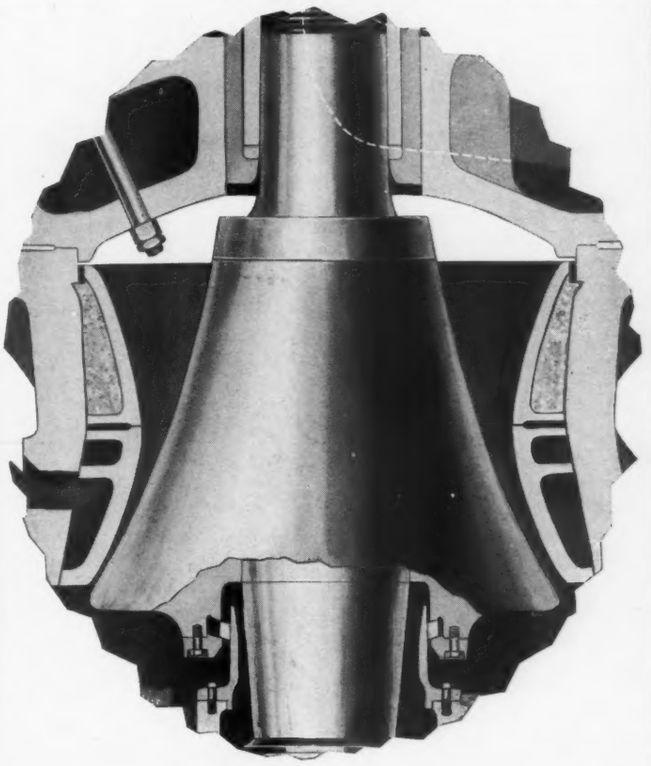

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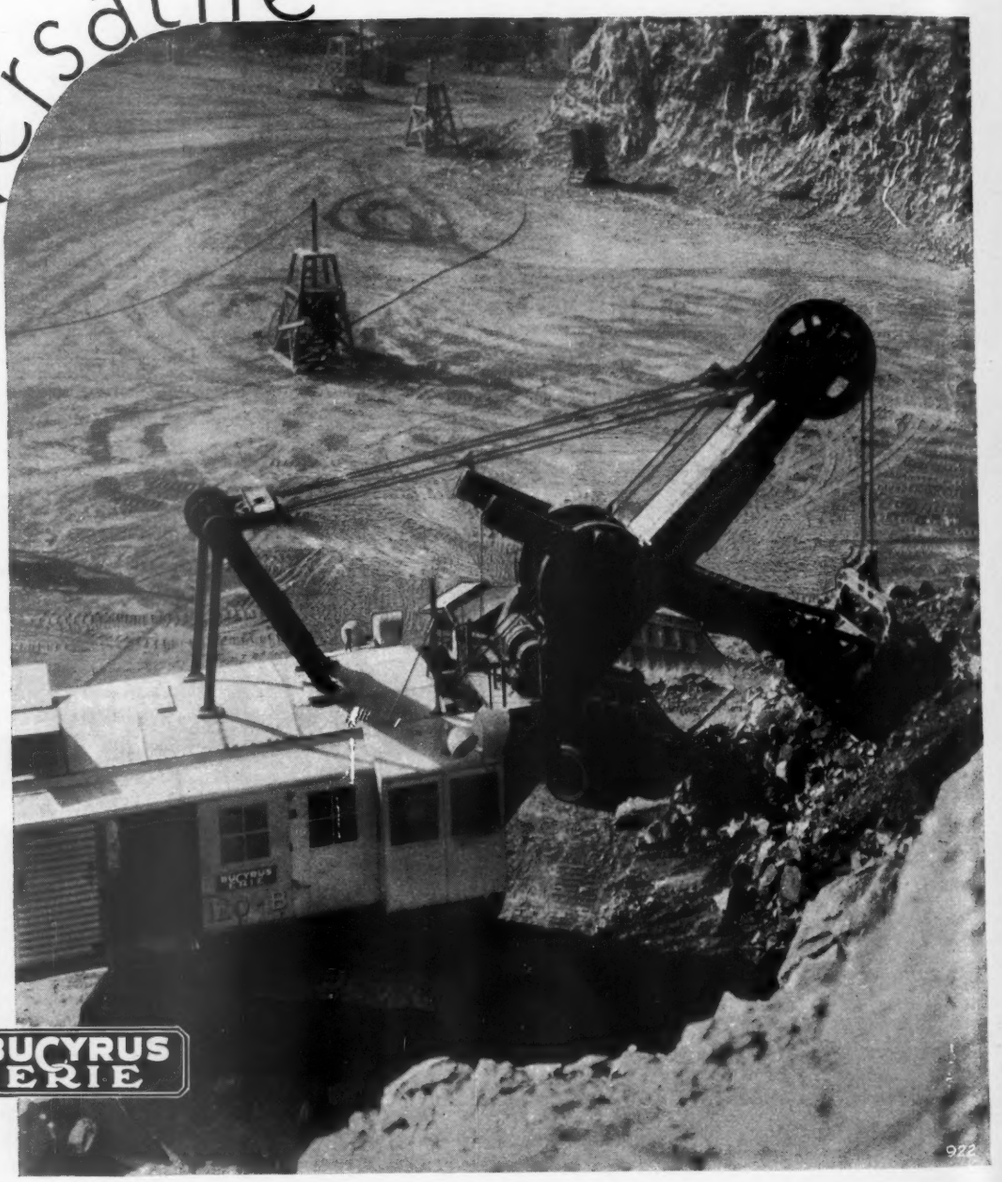

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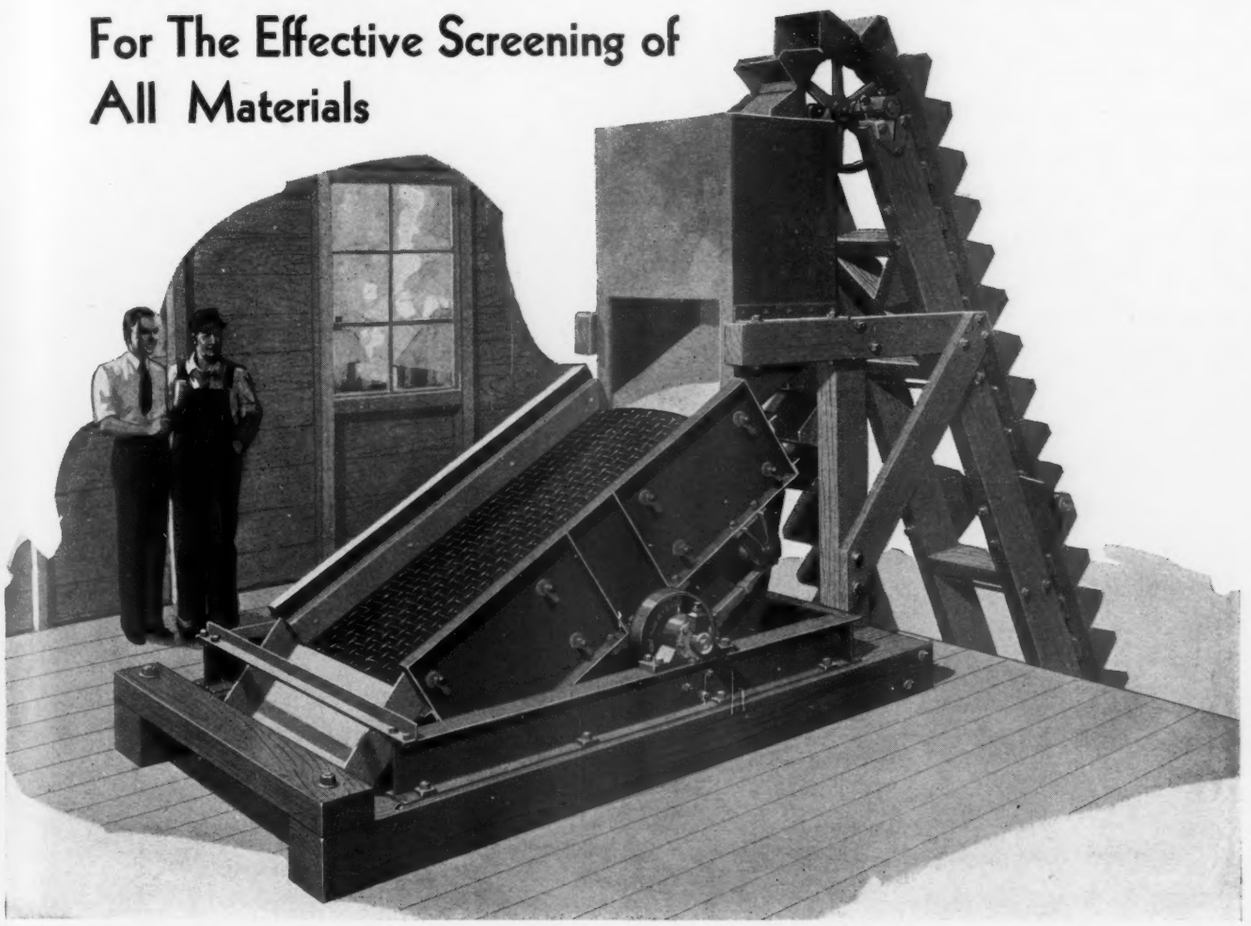

1 Mechanically operated with few moving parts, resulting in low operating and maintenance costs.

2 No dead screening areas. Method of imparting uniform intensity of vibration, results in maximum efficiency, capacity and long life.

3 The screen cloth is entirely unobstructed, permitting free passage of material. Especially well adapted for the application of water sprays when washing, because of the uniform beds of material running down at a steady rate.

4 Angle of incline of screen can be readily changed to suit conditions.

5 Heavy combination coil and leaf spring assemblies maintain angle of incline, absorb shock loads and prevent side sway while conforming to circular motion of vibrator.

6 Only the screen cloth needs to be removed when cloth replacements are necessary. Simple and easy.

7 Mounted on substantial steel base permitting supporting below or suspension by cables.

8 All bearings are exact duplicates, and are of the self-aligning roller type, enclosed in dust-proof housings.

Rock Products 5223A

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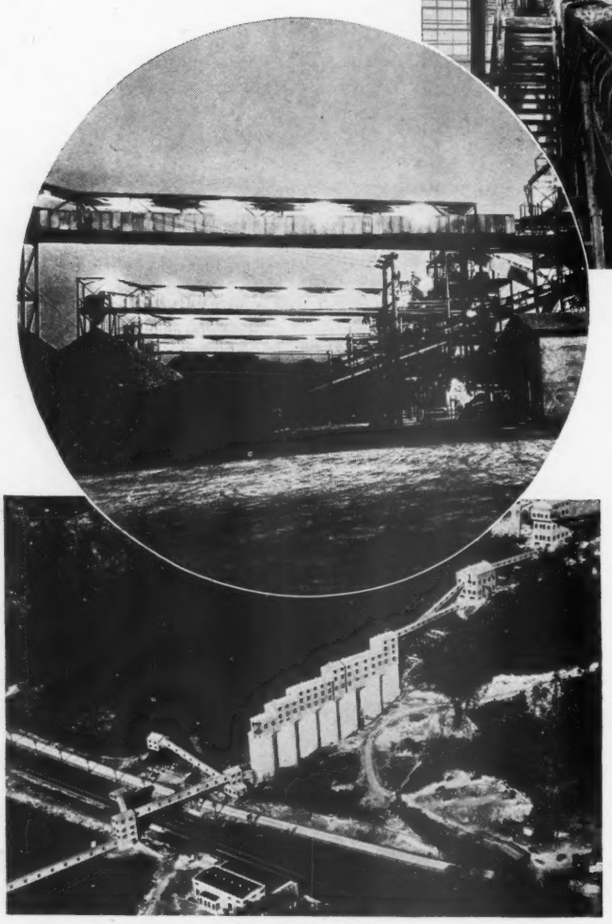

The main reason is an all-round superiority that has led so many sand, gravel, stone plants and major construction jobs to standardize on Rex-Stearns.

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.... *which do you need in your plant?*

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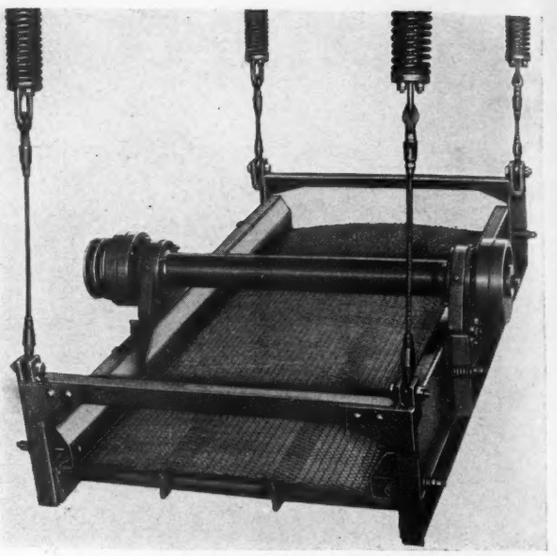
Aero-Vibe Screens

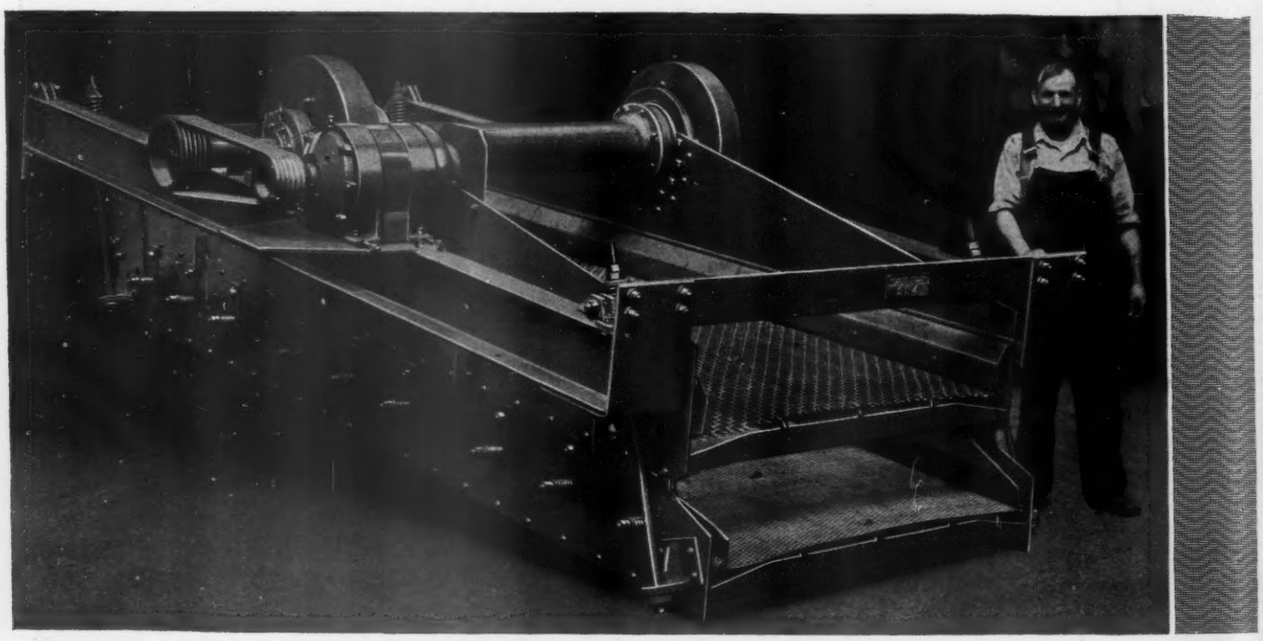
The "Aero-Vibe" screen "floats in the air" suspended from the supporting structure by cables and springs. A rapid, adjustable, vibrating motion is produced by counterweighted wheels mounted on the drive shaft supported in anti-friction bearings above the screen body or vibrating member. Single and double deck "Aero-Vibe" screens are available from 1½ x 3 ft. to 4 x 10 ft. sizes for handling medium to fine size materials, and for limited tonnage.



3'x6' Single Deck Aero-Vibe Screen

Centrifugal Vibrating Screens

Style "B" Centrifugal screens are built with one, two, or three decks in sizes from 2 x 6 ft. to 5 x 14 ft. and are adaptable for heavy loads and the maximum range of material size. The screening action, which is equally intense for all tonnages, is transmitted to the screen body or vibrating member by an eccentric shaft located above the screen and supported in anti-friction bearings. The screen body "floats" on balance springs reducing power and the load on the bearings; the entire screen is cable and spring suspended.



5'x14' Double Deck Style "B" Centrifugal Vibrating Screen

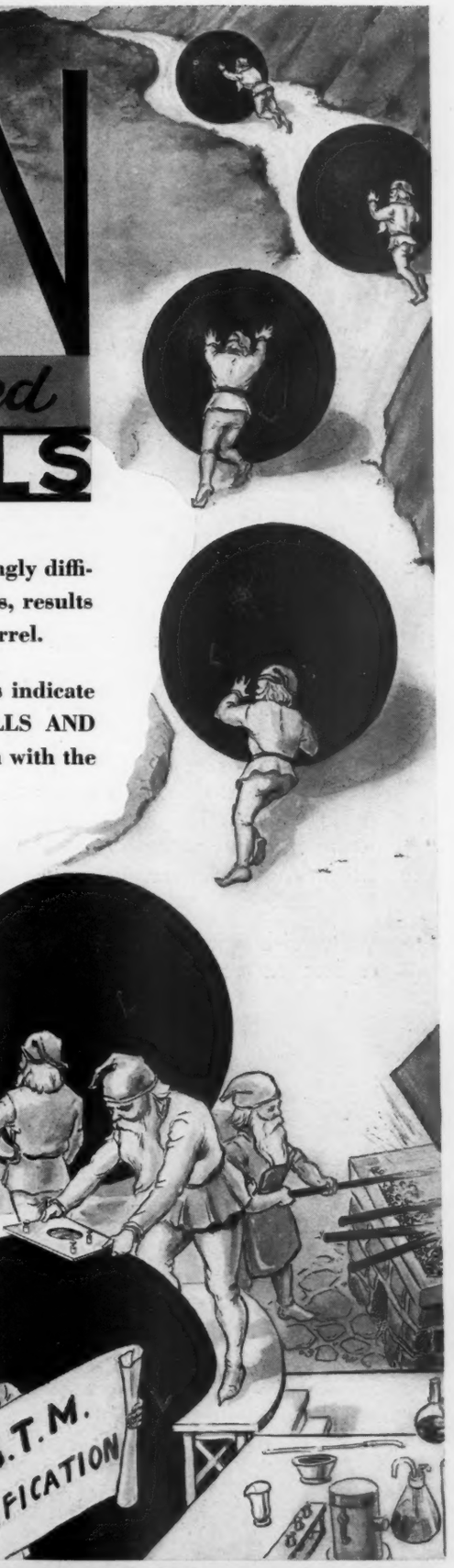
ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

LORAIN

Forged Steel Heat Treated

GRINDING BALLS



Grinding cement to the extreme fineness required by the increasingly difficult specifications for the finished product of high early strengths, results in lowered production of output and with increased costs per barrel.

Rigidity in the requirements of the finished cement specifications indicate the need of the best obtainable materials for GRINDING BALLS AND LININGS, to assist in maintaining the highest possible production with the lowest possible costs of renewals due to wear.

LORAIN GRINDING BALLS are manufactured to definite analysis in metals known for their qualities of resistance to wear in grinding, and they are heat treated to effect resistance to wear in accordance with the grinding service imposed by their use.

Your order for LORAIN GRINDING BALLS, or LININGS, is our obligation to effect satisfactory grinding service in your plant. Balls can be furnished promptly in the following diameters:

½" — ⅝" — ¾" — ⅞" — 1" — 1¼" — 1½"
2" — 2½" — 3" — 3½" — 4" — 4½" — 5".

THE LORAIN STEEL CO.

General Office: 545 Central Avenue, Johnstown, Pennsylvania

Sales Offices: Atlanta, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh and Denver

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco, Calif.

Export Distributor: United States Steel Products Company, 30 Church St., New York City, N. Y.

United States Steel U·S·S *Corporation Subsidiary*

VELOCITY CONTROL...

. . . Vital to the Engineer at His Throttle!

. . . All-Important to the Quarryman!

The right control of velocity—the right control of strength—gives the difference between day and night in quarry blasting. Rock conditions vary tremendously—hard, soft, brittle, tough, resilient, fine, coarse, just to mention a few of them—with every one, the quarryman's problem is to select the right explosive to give ideal control.

Now, with Apex, the new Atlas quarry explosive, the quarryman is offered Velocity Control for the first time. Apex is made in three grades—with three velocities (high, medium and low) to each grade—to assure the quarryman selection of the explosive with the right velocity in each grade that is best for his rock formation.

Apex is not a magic solution for all quarry-blasting problems. But experience with Apex demonstrates that it represents a great advance in supplying controlled force to quarry blasting. Apex promotes better fragmentation, favorable drilling costs, lower blasting costs and higher shovel production. The distinctive, flexible waterproof cartridge packing further extends the adaptability of Atlas Apex.

We invite quarry operators to let the Atlas representative demonstrate Apex.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Kansas City, Mo.	New York ,N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
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ATLAS

EXPLOSIVES

Streamlined PERFORMANCE SPEEDS UP PRODUCTION

STREAMLINING can be had in an excavator. Not in the same sense that we use it in connection with the modern automobile, plane or high speed train. LIMA--the modern excavator--carries the idea beyond the appearance and into the performance of the shovel, dragline or crane.

Roller bearings and helical gears throughout, large diameter drums and clutches, splined shafts and square lever shafts make for smooth, quiet, easy performance. Ample power is always available for hoisting, swinging, propelling, and raising or lowering the boom simultaneously, if necessary.

These advantages, and innumerable others, speed up production and give streamline performance in every kind of digging. The modern excavator in line with the times.

Lima Locomotive Works, Incorporated

SHOVEL AND CRANE DIVISION LIMA, OHIO, U.S.A.

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CHICAGO 1543 Straus Bldg.

NEWARK, N. J. 317 Frelinghuysen Avenue

SEATTLE 4428 First Ave. So.

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MEMPHIS 77 McCall Street

The General Supply Co. of Canada, Ltd. Ottawa, Ont.

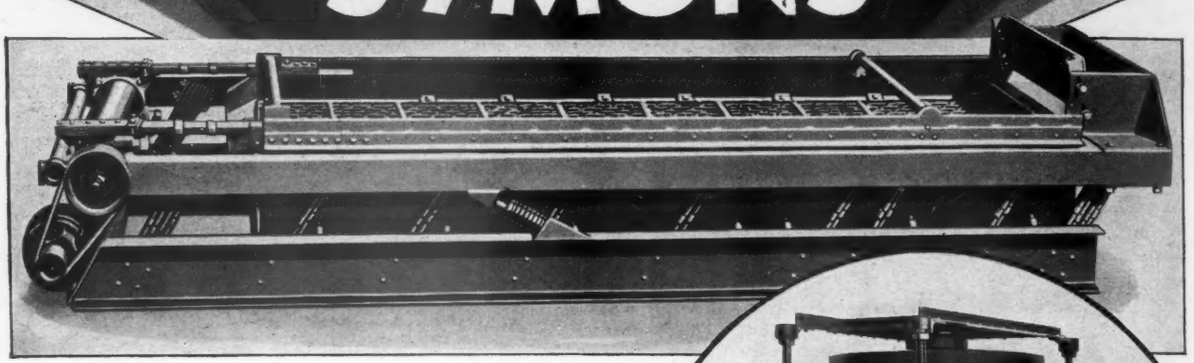
Tyee Machinery Co. Ltd Vancouver, B. C.

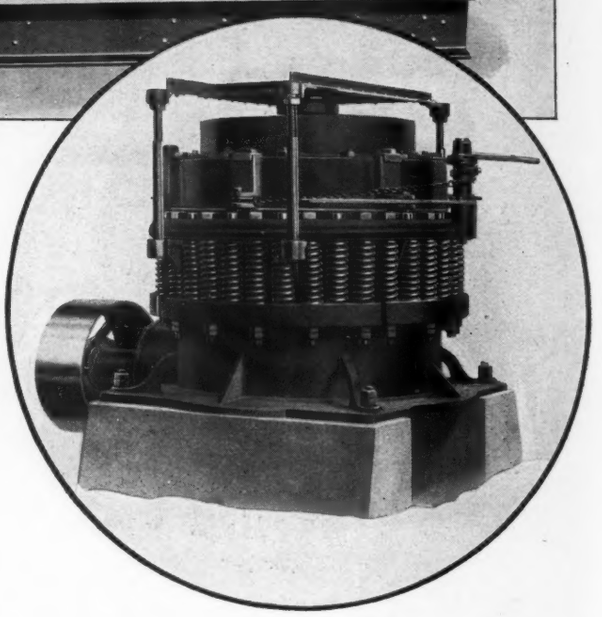
LIMA

One of three LIMAS owned by Sam Orino, Spokane, Wash. This Type 601 is working on the Bonneville Dam.

LIMAS ARE BUILT IN 3/4 YARD CAPACITY AND LARGER

For Better SCREENING and Finer CRUSHING you can depend on SYMONS





Every producer of screened materials recognizes the advantages of a level screen.

For fine crushing, the Symons Cone stands without an equal.

It is almost ten years since the first Symons Cone was placed in service. During that period, they have gone into most of the major plants where fine crushing is done in quantity.

Just as outstanding as was the Symons Cone in crushing, so is the Symons Screen in screening. Operating on a different principle, it delivers better graded sizes that meet today's rigid specifications.

To be assured of the best in crushing and screening equipment, let us tell you how your problems can best be solved with Symons.

NORDBERG MFG. CO. MILWAUKEE, WISCONSIN

NEW YORK CITY
60 East 42nd St.

LONDON, W. C. 2
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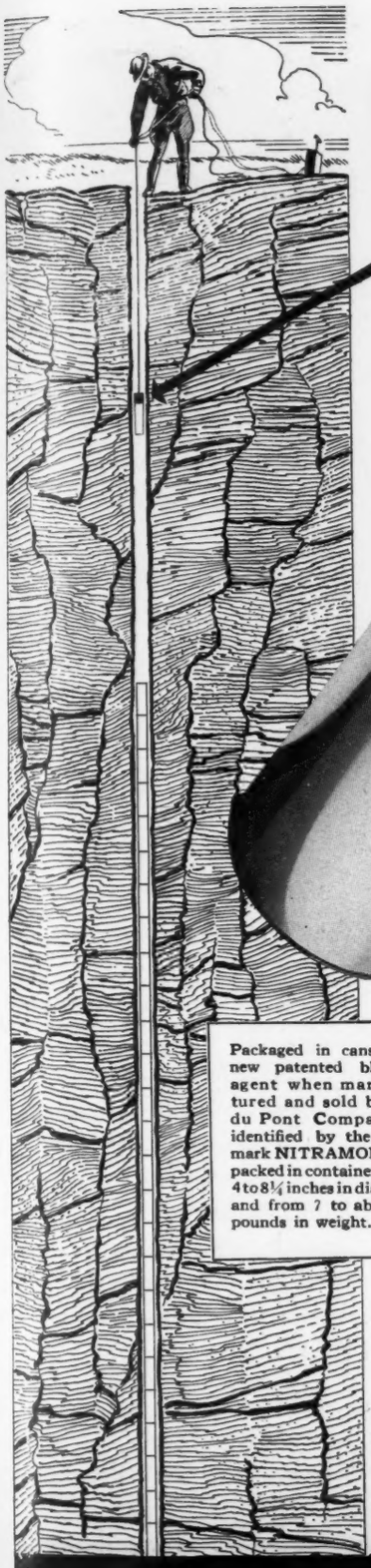
LOS ANGELES, CALIF.
Subway Terminal Bldg.

NITRAMON

TRADE MARK



NITRAMON can only be detonated when dynamite or T. N. T. cartridge is used.

is safer!

WHEN subjected to the usual tests applied to explosives, NITRAMON cannot be detonated *by the strongest commercial blasting cap—by Cordeau—by flame—by friction—or by impact.*

NITRAMON develops exceptional blasting strength when detonated by a cartridge of either dynamite or T.N.T. This cartridge is placed on the top of a column load of Nitramon in a well drill hole.

Until the priming cartridge is in place, there is no danger while loading NITRAMON. In case of a misfire due to any outside causes, the primer can be removed and the NITRAMON becomes safe to be unloaded by any of several methods.

In addition to its *safe* features, NITRAMON has other important advantages:

1. SAVES MONEY—Its design is so efficient that satisfactory results are obtained at substantial savings.

2. SEALED AGAINST WATER—Packed in water-tight metallic containers.

3. WILL NOT FREEZE.

4. PRODUCES NO HEADACHES—Contains no nitroglycerin.

5. LOADS QUICKER—Because of its convenient package.

A bulletin containing complete information on grades available and methods of use will be sent on request.

Packaged in cans, this new patented blasting agent when manufactured and sold by the du Pont Company is identified by the trade mark NITRAMON. It is packed in containers from 4 to 8¼ inches in diameter and from 7 to about 65 pounds in weight.

E. I. DU PONT DE NEMOURS & CO., INC.
Explosives Department, Wilmington, Delaware

BRANCH OFFICES—Birmingham, Ala.; Boston, Mass.; Chicago, Ill.; Denver, Colo.; Duluth, Minn.; Huntington, W. Va.; Joplin, Mo.; Juneau, Alaska; Kansas City, Mo.; New York, N.Y.; Pittsburgh, Pa.; Portland, Ore.; Pottsville, Pa.; St. Louis, Mo.; San Francisco, Calif.; Scranton, Pa.; Seattle, Wash.; Spokane, Wash.; Springfield, Ill.; Wilkes-Barre, Pa.

DU PONT

REG. U. S. PAT. OFF.

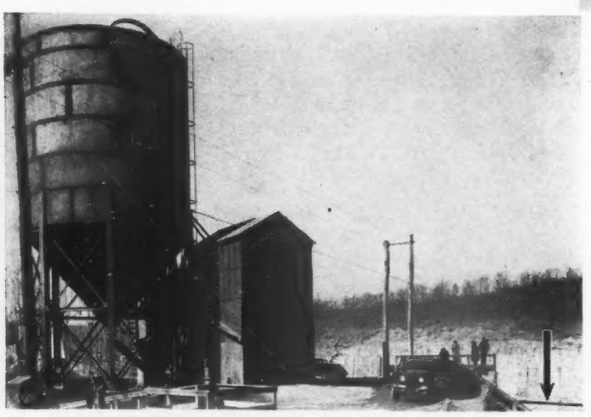
NITRAMON

TRADE MARK

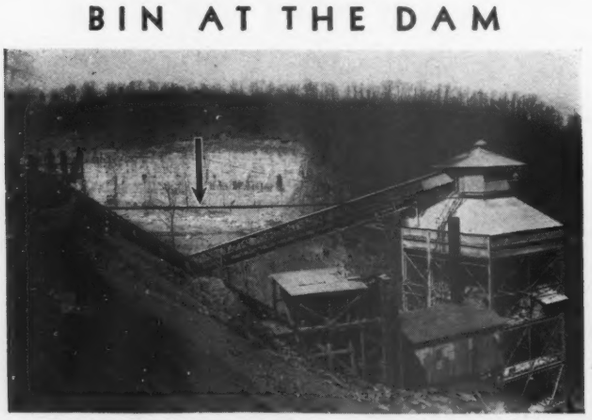
THE IMPROVED BLASTING MATERIAL

FULLER-KINYON CEMENT PUMPS AT NORRIS DAM

THE BULK CEMENT UNLOADING PLANT



TRUCK-HOPPER AND BIN AT THE DAM



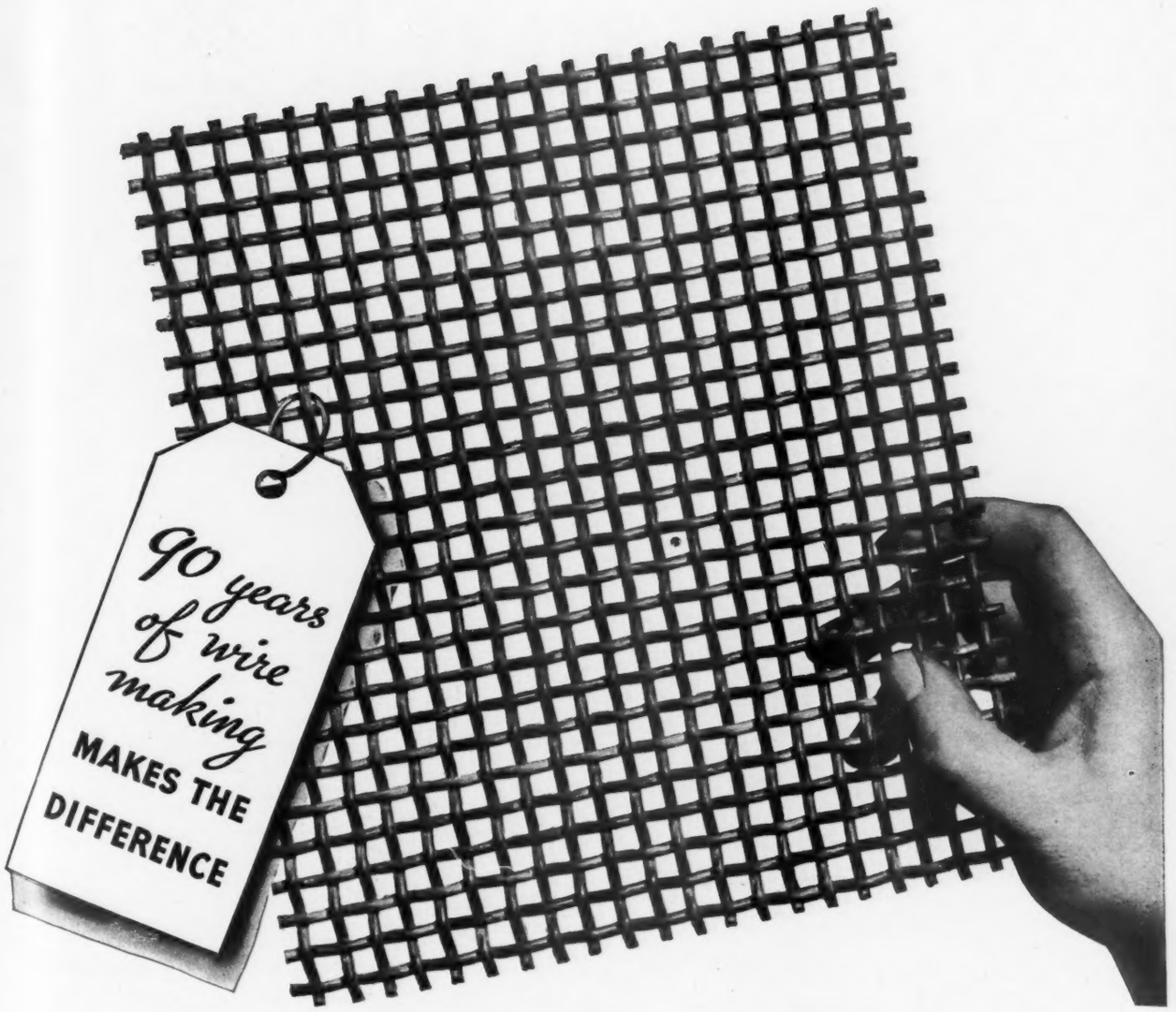
THE CEMENT LINE TO MIXING PLANT

Two types of Fuller-Kinyon Systems handle the cement for this great project. Two portable pumps, unload box-cars and convey through independent pipe-lines to a truck-loading bin at the railroad siding. The arrangement, shown above, provides for the unloading of four cars without shifting. Special trucks transport the cement five miles to the mixing plant where the loads are dumped into a hopper above two stationary pumps. One of these pumps is for stand-by service, but is connected to the pipe-line system for instant use. Cement is conveyed either directly to the mixing plant, or through a branch line to storage. When trucks are not discharging, the cement is spouted to the same hopper for transfer to the mixing plant.

Fuller-Kinyon Pumps offer the contractor speed with reliability, economical long distance conveying and unequalled convenience in plant layout. Our bulletin fully illustrates the use of these interesting conveyors in all classes of concrete construction service. For preliminary information, write for a copy.

Fuller Company
CATASAUQUA, PENNA., U. S. A.

Chicago: 1118 Marquette Bldg.
Paris: E. Constantin, 105, Rue Lafayette
Hamburg: Claudius Peters, Walhoff, Glockengiesserwall 2



AND ISN'T IT LOGICAL—*Listen...*

WIRE Screen is WIRE. It is *all* wire ... fabricated wire. If the wire fails ... the screen fails. If the wire can "take it"...the screen gives good service.

For over 90 years we have specialized in wire making. We have been making steel wire to meet exacting requirements... steel wire of extraordinary strength and toughness... for uses where stamina and durability must be certain. For sturdy hawsers ... for shovel rope ... for mammoth bridge cables ... for countless other purposes.

We put this 90 years of experience into our Wire Screen for sizing, cleaning and grading.

Why not take advantage of this experience? We would welcome an opportunity to cooperate with you in solving your screening problems ... and are confident that we can meet your severest requirements as to efficiency and resistance to vibration or abrasion.

Our nearest office is at your service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

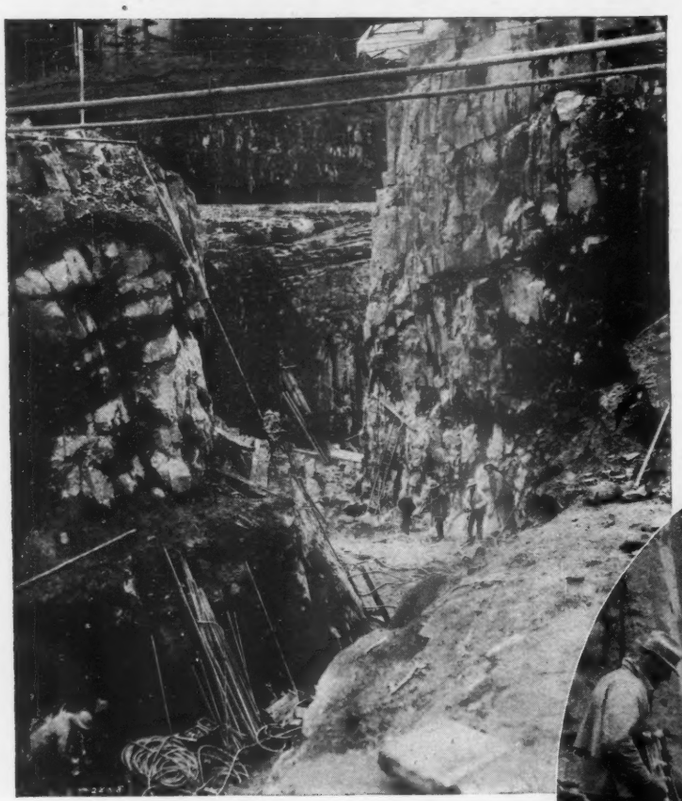
ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

TIMKEN ROCK BITS

are saving Time and Money at Bonneville Dam



Fishways between locks and power house, Bonneville Dam.

Drilling with Timken Rock Bits at Bonneville Dam.

MORE and more Timken Rock Bits are being used on the large construction projects. They were used at Boulder Dam. They were used at Pine Canyon Dam. And now they are being used at Bonneville Dam.

And wherever they are used, Timken Bits save time and money—because they drill faster, last longer and eliminate reforging. Ask any contractor, mine or quarry operator who uses them. They know.

In a recent letter Mr. D. H. Henderson, Superintendent for General Construction Company and J. F. Shea Company, Inc., general contractors for the Bonneville Dam job, wrote: "We have used Timken Rock Bits on our contracts on the Bonneville, Oregon, project and are pleased with their performance. On this particular project during the past year we have purchased in excess of 12,000 of your bits".

That's positive proof that it pays to use Timken Bits. Are you using them? If not you are losing money on every hole you drill. Write for a copy of the new Timken Bit booklet just off the press.

Complete Stocks Maintained in Principal Distributing Centers

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS

● "U.S." introduces a brand new *type* of hose for pneumatic tool and air drill service—U. S. Super Royal Cord, the *only* air hose built *like a tire.*

The body of the hose is made with each layer of "tire-like" cords laid in tough rubber cushions, isolated from adjacent layers to prevent rubbing or shearing. Consequently, the hose can withstand any amount of pulsation, sudden expansion under pressure, or constant flexing in use.

This new kind of hose carcass makes "U.S." Super Royal Cord so tough and resilient that it shows a *remarkable* resistance to external blows, bruises and abrasion. This durability is due both to the internal structure and the specially compounded brown rubber cover, which will stand unusual abuse and will not peel off, when cut or gouged.

Furthermore, the tube of the "U.S." Super Royal Cord is the finest quality oil-resistant rubber it is possible to make—your assurance of protection against the destructive action of hot oil in the air line.

This is the hose with *all* the good qualities you have always wanted. There's nothing else like it on the market. Let "U.S." give you complete data and description, without obligation of course. Write the "U.S." Rubber Products, Inc. branch.

United States Rubber Company

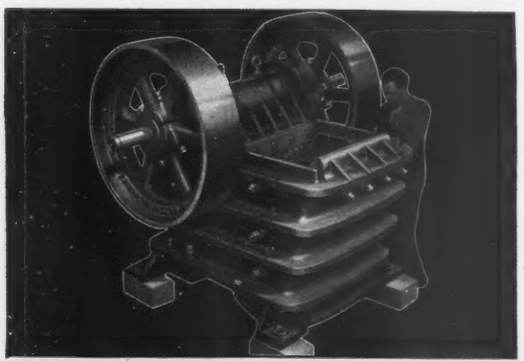
1790 Broadway • • New York City

U.S. SUPER ROYAL CORD HOSE

An Outstanding Value of the United States Rubber Company

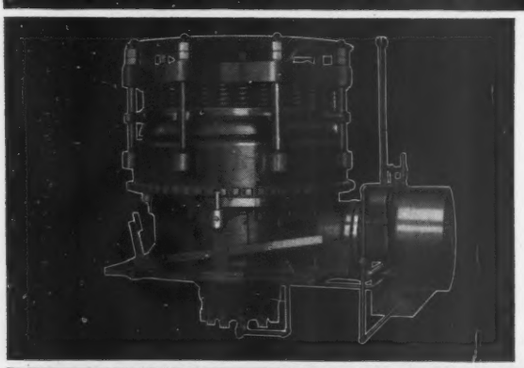
3 WAYS TO BETTER THE PRODUCT AND CUT OPERATING COSTS

Modern in every sense of the word . . . . designed to enable you to meet today's conditions and operate at a profit . . . . this 3-piece combination of Telsmith equipment is a striking example of group efficiency.



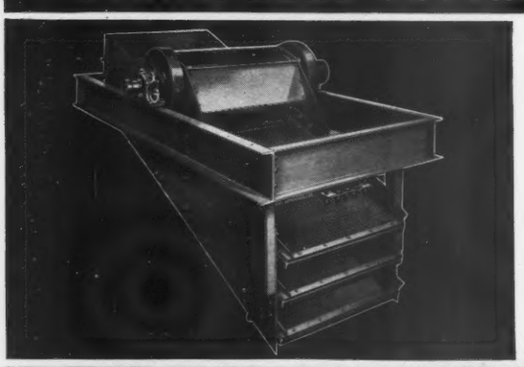
● With its compact but massive steel structure, cylindrical roller bearings and high speed crushing action, the Telsmith-Wheeling Jaw Crusher is ideal for coarse crushing. The roller bearings and higher speed almost double the capacity without any greater expenditure for power. Simple adjustment allows wide sizing range. Up-keep is reduced to a minimum. Write for Bulletin W-11.

WHEELING JAW CRUSHER—FOR COARSE CRUSHING



● The Telsmith Gyrasphere takes the trouble out of secondary crushing. Working at choke feed, it turns out a bigger tonnage and more cubical product—crushes finer, with low power consumption and up-keep. The reasons—spring relief, rotary head support, spherical head, unit spring design, anti-friction thrust bearings, pressure lubrication, different distribution of crusher pressures. Write for Bulletin Y-11.

GYRASPHERE CRUSHER—FOR FINER CRUSHING



● The Telsmith Pulsator screens crushed rock, sand, gravel, ore or coal . . . wet or dry. Its circular movement produces a maximum screening action, uniform on every inch of the wire, on every deck, under any load. The toughest alloy steels, the finest anti-friction bearings and special labyrinth and piston ring steels (to protect working parts) give longer life and lower up-keep. Write for Bulletin V-11.

M-1

PULSATOR—FOR EFFICIENT SCREENING

50 Church St. . . . . New York City
211 W. Wacker Drive . . . . . Chicago, Ill.
130 So. 15th St. . . . . Philadelphia, Pa.
605 Statler Bldg. . . . . Boston, Mass.
412 Westinghouse Bldg. . . . . Pittsburgh, Pa.
Milburn Mchy. Co. . . . . Columbus, Ohio
Thomas G. Abrams . . . . . Detroit, Michigan

SMITH ENGINEERING WORKS
508 EAST CAPITOL DRIVE, MILWAUKEE, WIS.

TELSMITH

P&H HAS SPEEDED UP *the* DIGGING CYCLE

FOR A BIGGER DAY'S WORK

WITH P & H ELECTRIC DRIVE

Abundant horsepower . . . faster swinging . . . balanced machinery units on the main working frame . . . less counterweight...these are some of the reasons why P&H Ward Leonards are big producers. In speeding up the swing as high as 3½ RPM, P&H engineers have licked the real problem of faster digging. Remember that the swing absorbs nearly 67% of the digging cycle.

If you've got a big job in dirt or rock, we will present some facts that will interest you. Better investigate these P&H Ward Leonards. Their modern design does things to handling costs.

HARNISCHFEGER CORPORATION

4463 W. NATIONAL AVE. *Established 1884* MILWAUKEE, WIS.

Warehouses and Service Stations:

Hoboken Memphis Jacksonville Seattle Dallas Los Angeles San Francisco

More Power, Less Weight Speed Up Action of P & H Electric Excavators

The outstanding feature of the P&H Ward Leonard is the faster operating speeds accomplished through high total horsepower and a more advantageous distribution of weight.

The latter refers to the careful grouping of generators, etc., back of the center of rotation to do away with most of the additional counterweight used in conventional designs. Less counterweight means less dead weight to consume motive power and retard action.

100% Electrical Control

Every move the machine makes is electrically controlled from the operator's cab and simplified to a remarkable degree. Steering, too, is accomplished through the use of hydraulic cylinders electrically controlled from the driver's seat. Travel speed runs as high as 1½ miles per hour—extremely fast for a machine of this size.

Main brakes and clutches are also hydraulically operated, eliminating hand levers, manually operated foot pedals, etc.

Hoist Mechanism

The unusually compact hoist mechanism is a sturdy high speed unit. The large hoist motor is connected to the hoist drum through a set of herringbone gears and a set of massive spur gears. The first reduction mechanism is equipped with anti-friction bearings and operates in an oil bath. The large, heavily loaded hoist drum shaft turns in a long, bronze, sleeve bearing.

The hoist drum, of large diameter, with turned grooves, is easy on cable.

Swing is Faster

On the larger models two swing units are employed. Vertical type motors are used, thereby avoiding the use of spur gears. The helical cut gears are longer lived and operate more quietly —the gears operate in an oil bath. All shafting is mounted in anti-friction bearings. The entire mechanism has been given a large factor of safety to withstand, for a long period of years, the heavy service imposed. Starting from rest the speed of the swing motors increases gradually, thereby reaching maximum speed as quickly as possible—yet smoothly and quietly.

P&H WARD LEONARD ELECTRIC EXCAVATORS

Another mouthful coming up...

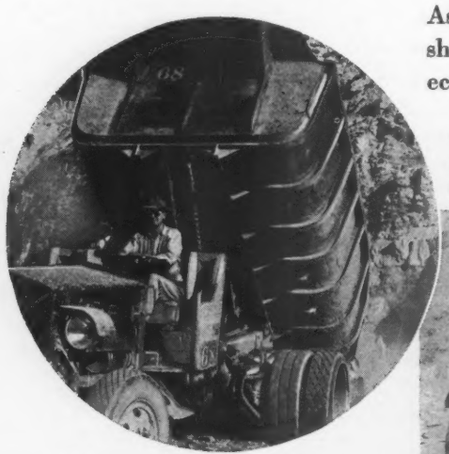
Will *your* trucks take it?

Where's the profit in driving heavy-duty equipment at top speed if trucks can't keep coming up to "take it away?"

Results prove that Texaco can keep your trucks rolling efficiently and economically. Texaco *Fire-Chief* Gasoline provides the extra margin of power to help trucks climb out of the hardest spot. Texaco Motor Oil will stand up and keep engines from balking no matter how hot the going. Marfak will protect universals, wheel bearings, shackles, steering systems, against wear that puts trucks out of service.

Why take chances with profits? Ask a Texaco representative to show you proof of maintenance economy, low operating costs and continuous trouble-free service in many other plants like yours.

THE TEXAS COMPANY
135 East 42nd Street New York City
Nation-wide distribution facilities assure prompt delivery



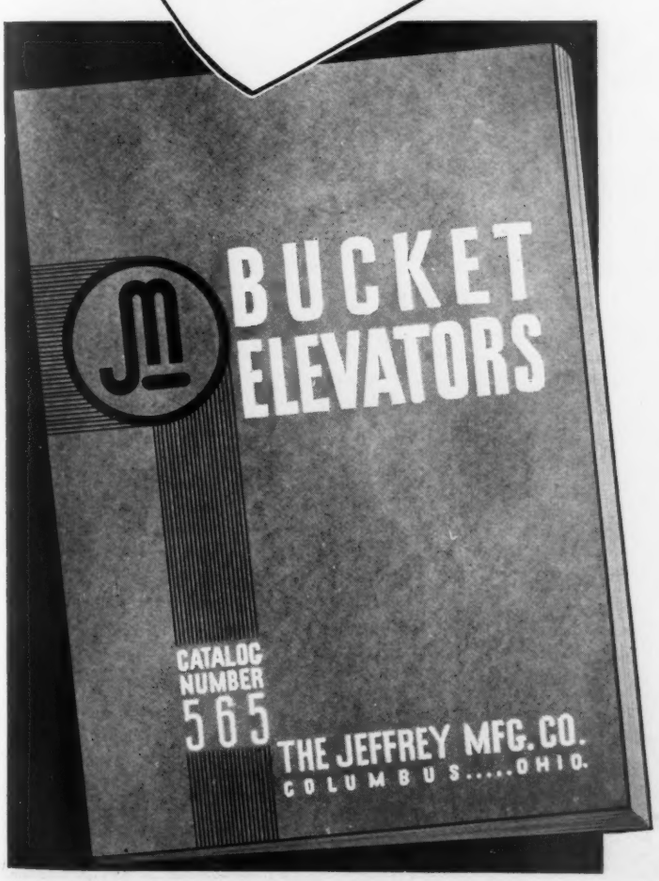
TEXACO MOTOR OIL keeps engines cool and sweet-running, even under heaviest loading and fast road work.

TEXACO *FIRE-CHIEF* means extra miles per gallon. It was made for fast, heavy work.

TEXACO MARFAK cushions the shocks that result in wear. Marfak often lasts three times as long.

TEXACO *tested* LUBRICANTS

REFINERY TESTED FOR UNIFORMITY • • • SERVICE TESTED FOR ECONOMY



• A wire for you, Sir. It says, "The New Jeffrey Bucket Elevator Catalog No. 565 is ready for you." Yes Sir, Catalog No. 565 is just off the press and a copy is yours for the asking.

Containing 112 pages of valuable data to assist you in the selection of a bucket elevator, this New Jeffrey Catalog is most comprehensive. It embodies the most complete information on Bucket Elevators ever offered industry.

When you select a Jeffrey you insure your plant against loss due to experimentation . . . because Jeffrey Standard Elevators have been proved by experience. You profit in two other ways: You save special engineering costs and you benefit by our lower production costs.

No matter what class of loose materials is to be handled; what capacity; or under what conditions; a Jeffrey Bucket Elevator can be found to exactly meet that requirement.

So this New Catalog No. 565 should occupy a place in your files as a complete reference book on the subject of Bucket Elevators.

The Coupon Below Is for Your Convenience

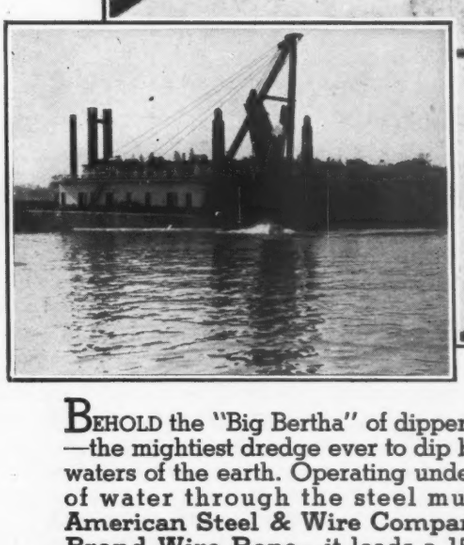
The Jeffrey Manufacturing Company,
935-99 North Fourth Street, Columbus, Ohio.
Please Send Copy of Catalog No. 565.

Firm Name .....
Individual .....
Address .....
We are interested in handling .....

BEHEMOTH, TAKE A BOW!

TOLEDO III

Owned by M. A. Breymann. Operates a 17-yard bucket for hard digging—a 28-yard bucket for soft digging. 150 feet in length—58-foot beam—12 feet from deck to bottom. Boom 85 feet long—10-foot boom sheave. Has largest main hoist rope ever built for this type of equipment!



BEHOLD the "Big Bertha" of dipper dredges—the mightiest dredge ever to dip below the waters of the earth. Operating under 50 feet of water through the steel muscles of **American Steel & Wire Company Tiger Brand Wire Rope**—it loads a 1500 yard scow in practically two hours—and doesn't even work a "sweat" up about it. When it came to selecting the right wire rope to engineer this giant—naturally the owners of this largest Dipper Dredge in the world turned to the builders of the largest selling wire rope in the world—**Tiger Brand Wire Rope.** Wherever dredges dip, derricks swing and weights suspend, you'll find this safer—more dependable—more economical wire rope operating in the thick of things. Facts—and full cooperation—await your inquiry.

LARGEST DIPPER DREDGE IN THE WORLD CHOOSES

TIGER BRAND
REG. U. S. PAT. OFF.
WIRE ROPE

AMERICAN STEEL & WIRE COMPANY

208 S. LA SALLE STREET, CHICAGO • • EMPIRE STATE BUILDING, NEW YORK

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Export Distributors: United States Steel Products Company, New York

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Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII | Chicago, May, 1935 | Number 6

Recovery Progress—Trends—Editorial Comment

MUCH has been written about NRA policies in respect to revising existing codes; farther on in this issue is a specific example of a recently revised code—that of the lime industry. The lime industry was one of the first to get an NRA code; it had had considerable experience with an unenforceable Federal Trade Commission "code of ethics"; it knew what it wanted in its NRA code; got more of the things it wanted than some of the industries whose code hearings were held subsequently.

The lime industry operated under its original code with a fair degree of success. So far as editorial inquiry can determine, the industry is definitely better off in every way than it was before. But, of course, every lime manufacturer is not satisfied because unanimity in any human relation is impossible. The case of the lime industry has been helped unquestionably by the fact that during the code's life the demand for lime has increased appreciably. However, experience developed that the original code had numerous "loopholes" that those who chose to use could use. It was decided to revise the code to close these loopholes. This was in May, 1934.

About that time NRA had come to regret some of the more "liberal" codes—that is, liberal in the sense that they gave some recognition to industry's desires or apparent necessities. Consequently, reopening of the lime industry's liberal code was welcomed by NRA. Lacking a few weeks it is a year since the code revised by the industry and submitted to NRA is now conditionally approved. According to the newspapers, and even to publicity stuff issuing from NRA, the administration has changed its mind (and its personnel) several times in the course of that year. Yet by persistent pursuit of objectives and constant emphasis on the objectives of NIRA, the lime industry emerges with a pretty good code—one that those competent to judge actually consider an improvement over the original one; at least it is more precisely worded.

Acme Photo

Messrs. Tugwell and Hopkins, who will spend some of the five billions appropriated for work relief.

So, unless Congress in renewing or revamping NIRA puts a serious crimp in the authority and province of NRA, it would appear that workable and helpful codes are still available to industries which have the patience, persistence and intelligence to keep after their objectives. Boiled down, these objectives in every industry are merely a desire for orderly and sane methods of marketing the products of the industry. The NRA is beginning to recognize this and its recent treatise on open-pricing contains a defense of price uniformity for standard basic commodities. Also in its report on the effects of Executive Order 6767, which permitted a 15% cut below the bidder's filed prices, when bidding on government requirements, NRA defended, under certain conditions, uniform or tie bids.

The following paragraph from this report is especially significant: "While it is tie-low bids that create a problem for governmental purchasing agencies, it is nevertheless true that such bids may indicate the closest kind of competition for governmental business, a competition which may only be resolved from the viewpoint of the purchasing agent by consideration of standards of quality and service. The study indicates definitely that tie-bids were widely prevalent prior to the codes. Moreover, in numerous industries the percentage of tie-low bids prior to the codes was strikingly high. The codes did not create the purchasing agent's problem. Seemingly, the problem was intensified during the code period, although this was not the case with respect to the products of many indus-

tries; and, at least to some degree, the intensification may well have been due to the general stabilization of prices at the end of a long period of acute price changes subsequent to 1929. It is pertinent to note as to class IV industries, which showed a strong trend toward tie-low bids during the code period, that subsequent to Order 6767 this trend was sharply reversed. This situation raises doubt that there was collusion in the class IV industries." [Class IV industries are described as "a group of 18 in which Executive Order 6767 possibly was effective in bringing about bid diversity."—The Editor.]

The so-called administration bill now before Congress to continue NRA attempts to remove the constitutional objections or handicaps of the present Title I, NIRA, and to carry on the present rules, regulations and policies of NRA now in effect with respect to the administration of the NIRA. Developments show that while the present Congress does a lot of spouting and objecting for political purposes or for its members' personal publicity, it almost invariably winds up by surrendering to the administration. It is a pretty safe bet, then, that NRA and the codes will continue, although it is not too late, and it is still highly desirable, that producers express their honest convictions to their congressmen and senators.

All political prejudices aside, producers should ask themselves these questions, submitted by Norman G. Hough, president and general manager of the National Lime Association, to its members:

(1) Do we wish to return to uncontrolled, and frequently destructive, cut-throat competition?

(2) Do we want the Black Bill to become law, imposing a blanket 30-hour week upon all industry?

(3) Do we want labor matters to fall under some governmental agency other than NRA, eliminating the contemplated coördination of the rights and duties both of labor and management as established under the codes?

(4) Do we want the Federal Trade Commission to supervise the enforcement of fair trade practices, and do we want the anti-trust laws restored to their former rigid status?

(5) Are we as individuals and as an industry better off now than we were in 1932?

(6) Are we to destroy the vast amount of constructive work of the past two years?

Quick Starting of Public Works Needed

For the first quarter of 1935, the dollar volume of the construction industry as a whole was 36% below the same quarter of 1934. Construction of public works and public utilities was less than half as active. Hence, it is clear that with general business in its present reluctant and hesitant mood, only more and more public works can begin to fill the gap in the construction industry. Since, apparently, the New Dealers were too busy dispensing the original $3,300,000,000 NIRA fund to plan ways to spend $4,880,000,000 more, the new appropriation of Congress finds many obstacles to immediate use.

It seems rather ironical that an administration which is planning public works and land conservation 200 or more years ahead could not have seen more than two years ahead when it sought and obtained the original $3,300,000,000. It would seem a fair assumption that the examination of many projects and a study of accomplishments, if any, would have pointed the way to the investment of additional billions should they be required, or ever be available. That certainly would have been the case with any private business organization.

In the present instance, however, the President, for reasons of his own, which he has not justified, has seen fit to establish a new bureau, or administrator, to pass on applications for public funds, presided over by his former campaign treasurer. As heretofore, Mr. Secretary Public Works Administrator Ickes, will run the engineering and accounting bureau which actually spends such of the cash as may be spent for construction; but he will have considerably less—maybe nothing at all—to say as to who shall get it or what for.

Unless the construction industry wants to look forward to another public works bill—which with arithmetical progression and depreciating dollars will evidently be something like $6,000,000,000—in 1937, every branch of the construction industry—in fact, all industry, but the construction industry most because it is most concerned—will have to lend its best efforts to seeing that the U. S. A. has more to show for its second spending orgy than it has for the earlier one. This is not merely a matter of patriotism. It is common sense. The government is about the worst imaginable party to any construction contract; $6,000,000,000 of private construction is vastly to be preferred to the same volume of government construction—at least it would be spent for construction rather than for political ends—and so long as the federal government monopolizes the construction industry's market from philanthropic motives there is scant chance that business men will have enough confidence in the future of any business to promote construction for themselves.

Code Developments

UNDER date of April 24, the NIRB issued a new and lengthy treatise on administrative policy relative to open-price filing. It has been aptly described as a scholarly and interesting exposition of the theory of the open-price policy, but of not the least value to practical business men in helping them solve their problems. The following is a sample of the wording of the official announcement:

"The burden of proof that a proposal contrary to announced policy is necessary must rest with the applicant industry. Unless such proof is furnished, the rules provide that no new provision contrary to policy will be approved, and no approved provision contrary to policy requiring further NRA action to become effective will be put into effect. At the expiration of any trial period of any contrary-to-policy provision, opportunity will be given its sponsors to show cause for con-

tinuing the period of trial or making the provision permanent.

"If a provision contrary to announced policy is fully operative in a code, two courses of action are open. 'If no adequate showing has been made to NRA that such provision is in conflict with the interests of the public or the justifiable interests of any group, arrangements for observation will be made; but no other action will be taken in the first instance.' On the other hand, 'If there is adequate reason to believe that such a provision is in conflict with the interests of the public or the justifiable interests of any group, the industry will be offered an opportunity to negotiate with NRA or to be heard on the subject. If, after such a hearing or negotiation, such conflict still appears and a satisfactory solution cannot be reached, the provision will be deleted, or suspended, or temporarily modified, pending approval of a satisfactory substitute or modification.'

"Action by the NRA approving or making effective applications for code provisions contrary to policy will not be taken, except in unusual cases, 'pending congressional decision concerning the jurisdiction and objectives of the NRA.'

"Supervision of the operations of policy decision has been delegated to the Code Administration Director. That post is filled at present by Prentiss L. Coonley. In addition, at least three persons will be appointed to aid in interpreting policy to divisional and deputy administrators. One will specialize on price and other trade practice policy, another on labor policy, and another on code administration policy. In addition, all executives and major staff officials, especially those in continual touch with the problems of industry, are directed to observe the operation of policy decisions, and the Division of Research and Planning will continue to make special studies and surveys."

Essential Characteristics of an Open Price Provision

"Price filing should be administered to serve the ends of a free and open market. An impartial and confidential body should be the administrative agency in order that price lists may be distributed to members of the industry and their customers without partiality and without efforts to influence the quotations. The prices must be genuinely available to all customers and members of the industry. If the body with which prices are filed is a private agency, its activities must be subject to the immediate oversight of the government. It is also essential to the purposes of open price filing that the filed prices be those at which sales are actually to take place rather than merely minima above which members of an industry may secretly vary their prices as they choose or maxima from which discounts are to be allowed.

"The general presumption must be against the use of the waiting period and the burden of proof is upon the industry which wishes to employ it. A protracted experience with the waiting period has revealed shortcomings, for which no one is consciously to blame and which are not easily avoided or corrected. A waiting period is likely to freeze a competitive process which should be kept active and to impair the very purpose for which sealed bids are used. In an open market there is no counterpart of such a device. When prices are rising a flood of orders during the waiting period may unsettle a future market. When prices are too high the incentive to reduce them in order to get more volume of sales may be lessened by the knowledge that price reduction will not become effective until competitors, by similar reductions, have destroyed most of the sales advantage.

"Probably the best case for a waiting period can be made for industries in which sales are of large size and small number, members are many and widely scattered, and information about prices cannot, for some reason, be quickly circulated. But even in such industries the burden of proof must be upon those who wish to employ a waiting period.

"In industries where prices immediately effective are manipulated for the purpose of allowing large discriminatory discounts to privileged customers, it may be necessary to impose some limit upon the frequency of price change. In such rare cases this can be done by provisions requiring that a price, once effective, must stay in effect for some reasonable minimum period. A waiting period before the price becomes effective is not necessary in dealing with this problem."

Price-Filing Not Price-Fixing

"It is hardly necessary to say that open price-filing is not price-fixing. Nor should evidence of collusion in their making be inferred from a uniformity in the prices which are filed. Competition is supposed to effect uniformity of prices through an open market; and an approximation to uniformity is almost certain to result from the proper maintenance of open price-filing. It is when the prices quoted by the members of an industry move in concert faster than competitors can easily accommodate themselves to each other's activities or when prices move uniformly and sharply upward in contrast to trends in related industries that evidence of collusion is present. Open price-filing is a device; price-fixing is a business policy in operation."

Lime Industry

The Code Authority of the Lime Industry has asked its members to avoid using the term "code price." The same should apply to all rock products producers. The Code Authority says: "The use of the term 'code price' is a dangerous practice, as it tends to create suspicion in the mind of the consumer that the code authority, or the code itself, fixes the prices of lime products. This, of course, is not true, and emphasis on this point should be stressed by sales managers in giving instructions to sales representatives."

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Following members have been elected to district control committees by the industry, subject to confirmation by NRA:

District Control Committee, District 6: Gordon W. Hughes, chairman, Inland Lime & Stone Co., Manistique, Mich.; E. P. Smith, Limestone Products Co., Menominee, Mich.; Morgan Curtis, Northern Lime & Stone Co., Petoskey, Mich.; W. F. Kerwin, secretary, treasurer and confidential agent, 504 Northern Building, Green Bay, Wis.

District Control Committee, District 8: V. F. Nast, chairman, Western Lime & Cement Co., Milwaukee, Wis.; Michael Brisch, Jr., Rockwell Lime Co., Chicago, Ill.; E. J. Groth, John F. Groth & Sons, Cedarburg, Wis.; Carl H. Ruedebusch, Mayville White Lime Works, Mayville, Wis.; James Fryer, secretary, Builders Building, Chicago, Ill.

Formerly these two districts had a single control committee. The personnel of the two trade practice complaints committees will be the same as of the control committees.

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The revised code of the lime industry was approved and became effective April 11. Extracts are printed elsewhere in this issue. Late word from the Code Authority states that the official (government) printing contains several errors.

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Crushed Stone, Sand and Gravel and and Slag

Several prosecutions by the Ohio state attorney general have been started for alleged violations of the state code for the crushed stone, sand and gravel and slag industries. The charges filed include alleged payment of less than code wages, working employes more than 48 hours a week, and an alleged threat to prevent the reëlection of a county commissioner unless the commissioners bought materials from the accused companies.

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Region 16 committee members met in Portland, Ore., April 9, to approve the regional budget for 1935 and to arrange to put in effect the agreement between code authorities of this industry and of the construction industry, in accordance with the results of the public hearing in Washington, D. C., March 21 (see ROCK PRODUCTS, April, pp. 50-51), which was designed to settle the contractor-producer problem.

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Ready-Mixed Concrete Industry

Pittsburgh, Penn., Marketing Area has applied for approval of its proposed $5600 area budget and basis of contribution for the period from March 1, 1935, to March 1, 1936. The basis of contribution is 7c per cu. yd. of production for the period July 1, 1934, to June 30, 1935, the assessments to be made and paid quarterly, in advance, effective March 1, 1935. This is in addition to the general code authority expenses.

Fighting Unprepared Aggregates Shabbily Produced for or by Public Authorities

R. E. O'Connor, Indiana Producer, Pioneers a Line of Attack by Asking That State Highway Specifications Be Made to Apply to All County Material

R. E. O'CONNOR, president of J. C. O'Connor & Sons, Inc., contractors and producers of washed sand and gravel, Fort Wayne, Ind., believes that the code of fair competition for the Crushed Stone, Sand and Gravel and Slag Industries should be limited in its application to processed materials made to meet a real specification, thus eliminating from the code administration all problems arising in connection with local pits, or what he says are called "pot holes."

Then the legitimate industry could concentrate on having specification material used by cities, towns, and counties, which are now paying really enormous prices (all costs considered) for very inferior materials. "As an industry," writes Mr. O'Connor, "we could function best were we able to obtain permissive areas in agreement with the State Highway Commission and applying only to the material for their use or of the quality required by their specifications."

In order to help visualize the loss to taxpayers under the present system of procuring aggregates for county highway work, Mr. O'Connor accepted an assignment to speak on "Specifications for County Road Materials" at the recent Purdue University Road School. Apparently, from his argument, most roadside material in Indiana is purchased rather than produced by the local authorities; but his arguments would apply even better in states where public authorities produce their own materials. Extracts from his address follow. Unfortunately, available space does not permit reproduction of the complete paper, which included many witticisms that helped to drive home to his audience the points which are reproduced here in cold print:

The Taxpayer's Viewpoint

"It is my intention to step out of my character as a contractor, material producer, or any other connection I might have with the construction industry," said Mr. O'Connor, "and deal with the question [of duplication of governmental activities] in the character of a wide-awake taxpayer of the year 1935—who has been thinking seriously and correctly on the whole proposition of how best to do away with the duplication he knows to exist in his government, the removal from it of the non-essential things, the breaking up of practices by which some individual has benefited at the expense of the many. All of which has piled up a tremendous burden of costs on him, the taxpayer. In other words, he is trying to work out a means by which he can have his government, be it city, township, county or state, conduct its affairs along the lines he must follow in the conduct of his own private business, all to the end that this government of his may justify his claim for its existence, and assure to him the retention of it [for he believes in local self-government].

"This taxpayer will, as a matter of course, direct his attention to the total tax set-up, will start with that collected by the state and then consider the county and local taxes. He will be very serious, inquisitive and thorough. He will chart the various departments of the state government, the duties they perform, and their costs. He will do this also for his county government, and by comparison of the two he will bring forth the overlapping and duplication of effort that is present in and between them. He will be so seriously interested that he will forget politics, and therefore will study his problem without prejudice, recognizing that the thing he is analyzing is in part the result of the consolidated efforts of all political parties, partly a product of the 'Hooey' period; and that he himself has a responsibility for it.

"This taxpayer will be cold-blooded in his determination, yet logical and fair in his conclusions; and while he strives to carry out what he has determined to do, he will act not to destroy but to prevent destruction of something very dear to him.

* * * *

"We will, for the sake of brevity, assume that he has completed his investigation, remembering what his answers have been. Are we logical in contending that he has discovered the vast importance of roads in his procedure, and the situation that exists in connection with them? Let us see how he has marked this item and registered it.

(1) He has set out first their necessity.

(2) The need for conducting a program of construction and maintenance.

(3) The agencies set up to carry on this work.

(4) The way these agencies are functioning.

(5) The vast amount of work and the money it has cost to develop information and to establish the standards used by these agencies.

(6) The way this information is actually used by the divisions of government in this state.

(7) The use of the facilities of these agencies by these divisions.

(8) The vast amount of materials used for roads and the maintenance thereof.

(9) How is it purchased?

(10) By whom supplied, and how delivered to the roads.

(11) How is the work of construction and maintenance carried on?

(12) Who pays for it?

(13) What does it all cost?

(14) How can the same or better results be obtained and yet reduce this cost?

"On items (1) and (2) we need have no fear of his reaction; but on the others that's another story. What are we going to do about most of them to keep him from going off the reservation? Would you like to defend our actions under them before this gentleman, and the many others like him? Do you think you could make a success of it?

"For your information, we, personally, have a great interest in seeing this fellow and his crowd satisfied, because most of us agree with them and do not fear that they will go crazy in what they ultimately will do. Our thought is to help them to do what they are justified in asking should be done, and to do this quickly, not letting delay and pressure cause them to get out of bounds and start throwing things about.

* * * *

"His survey has developed for him these further facts in connection with roads. He has found that in the 92 counties of this state, there is in every one of them a so-called specification covering, or intending to cover, things covered in the State Highway Specifications that have cost him so much.

"He discovers that there are so many differences of opinion and so much disagreement set forth in these county specifications as compared each to the other and to the state specifications, that he knows positively that somebody must be wrong, and that there is something hay-wire in the whole situation.

"He has examined, say the aggregate specifications, if any, that exist in these counties, and the methods by which the material is produced or purchased and used under them. He has gone into this and finds many cases where the counties have purchased and paid for piles of material and left it in piles for months and years before using it; and that the only specification under which thousands of tons of material were purchased and used by some counties was one which provided for little in quality, *and much passing a one-quarter inch screen.*

"In fact, this taxpayer had found many counties were purchasing and using material under a specification which qualified it, and set out a grading that required less than 10% of the material to be ¼-in. or plus ¼-in. in size.

"He has found out the amount the counties were paying for this and other like ma-

CHART SHOWING HIGH COST OF POOR AGGREGATES FOR COUNTY HIGHWAYS
COST PER CUBIC YARD, PIT-RUN MATERIAL, ON WHICH FIGURES ARE BASED
(These prices represent amounts paid by counties for such material.)

Actual cost per cubic foot, material retained on ¼ in. screen.
(Determined by using 6 per cent set out on left and dividing cost per cubic yard [pit-run] by this factor).

Per cent cu. yd. retained on ¼ in. screen	Actual cu. ft. retained per cu. yd. on ¼-in. screen	Cost per cubic foot $0.10	$0.15	$0.20	$0.25	$0.30	$0.35	$0.40	$0.45	$0.50	$0.55	$0.60	$0.65	$0.70
5 %	1.35	$0.074	$0.1111	$0.148	$0.185	$0.222	$0.259	$0.296	$0.333	$0.37	$0.407	$0.444	$0.481	$0.518
7½%	2.025	.049	.074	.0987	.1234	.1481	.1728	.1975	.222	.2469	.2716	.2963	.3209	.3456
10 %	2.70	.037	.0555	.074	.0926	.1111	.1296	.1481	.1666	.1851	.2037	.2222	.2407	.2590
12½%	3.375	.0296	.0415	.0592	.074	.0888	.1037	.1185	.133	.1481	.1629	.18	.195	.2074
15 %	4.050	.0247	.0370	.0493	.0617	.074	.0864	.0987	.1111	.1234	.1358	.1481	.160	.1728
17½%	4.725	.0211	.0317	.0423	.0529	.0635	.07407	.0846	.0952	.1058	.1164	.127	.137	.1481
20 %	5.400	.0185	.0277	.037	.0463	.0555	.0648	.074	.0833	.0926	.1018	.1111	.1203	.1296
22½%	6.075	.0164	.0246	.0324	.0411	.0493	.0576	.0658	.074	.0823	.0905	.0987	.107	.1150
25 %	6.750	.0148	.0222	.0296	.0370	.0444	.0518	.0592	.066	.074	.0814	.0888	.0962	.1036
27½%	7.425	.0134	.0202	.027	.0336	.0404	.0471	.0538	.0606	.0673	.0740	.0808	.0875	.0953
30 %	8.100	.0123	.0185	.0247	.0308	.0370	.0432	.0493	.0555	.0617	.0679	.07407	.0802	.0864
32½%	8.775	.0114	.0170	.0228	.0285	.034	.040	.0455	.0512	.0570	.0627	.0683	.0740	.080
35 %	9.450	.0106	.0153	.0211	.0264	.0317	.037	.0423	.0476	.0529	.0582	.0635	.0688	.074
37½%	10.125	.0098	.0148	.0197	.0247	.0296	.0345	.0393	.0444	.0491	.0543	.0589	.0642	.0688
40 %	10.800	.0092	.0139	.0185	.0231	.0277	.0324	.0370	.0416	.0463	.0509	.0555	.0601	.0648

ACTUAL COST PER CUBIC YARD, PIT-RUN MATERIAL, IF TRANSPOSED INTO CUBIC YARD OF MATERIAL GRADED TO BE RETAINED ON ¼-IN. SCREEN
(In accordance with percentages set out below.)

Cost pit-run per cu. yd.	Cost per cu. yd. 5%	7½%	10%	12½%	15%	17½%	20%	22½%	25%	27½%	30%	32½%	35%	37½%	40%
$0.10	$ 1.99	$1.32	$1.00	$ .80	$ .666	$ .57	$ .50	$ .44	$ .38	$ .36	$ .33	$ .31	$ .28	$ .26	$ .25
.15	2.99	2.00	1.50	1.12	.999	.85	.75	.66	.60	.54	.50	.46	.42	.40	.37
.20	3.99	2.64	2.00	1.60	1.33	1.14	1.00	.89	.80	.73	.66	.61	.57	.53	.50
.25	4.99	3.33	2.50	2.00	1.666	1.43	1.25	1.11	1.00	.91	.83	.77	.71	.66	.62
.30	5.99	3.99	3.00	2.39	2.00	1.71	1.50	1.33	1.19	1.09	1.00	.90	.855	.80	.75
.35	6.99	4.66	3.50	2.80	2.33	2.00	1.75	1.54	1.40	1.27	1.17	1.08	1.00	.93	.875
.40	7.99	5.33	4.00	3.20	2.65	2.28	2.00	1.77	1.60	1.45	1.325	1.23	1.14	1.06	1.00
.45	8.99	5.99	4.50	3.60	2.98	2.57	2.25	2.00	1.80	1.63	1.49	1.38	1.285	1.19	1.125
.50	9.99	6.66	5.00	4.00	3.31	2.85	2.50	2.22	2.00	1.81	1.655	1.54	1.425	1.32	1.25
.55	10.99	7.33	5.50	4.40	3.64	3.14	2.75	2.46	2.20	1.99	1.82	1.69	1.57	1.455	1.375
.60	11.99	8.00	6.00	4.80	3.97	3.43	3.00	2.66	2.40	2.17	1.985	1.84	1.765	1.59	1.50
.65	12.99	8.66	6.50	5.20	4.30	3.70	3.25	2.89	2.60	2.35	2.15	2.00	1.85	1.735	1.625
.70	13.99	9.33	7.00	5.60	4.66	4.00	3.50	3.10	2.80	2.54	2.33	2.16	2.00	1.88	1.75

EXAMPLE: County purchases pit-run gravel at price of 50 cents per cu. yd. This material under so-called county specification contains 12½% of material plus ¼-in. (12½% of 27 cu. ft. = 3.375 cu. ft. of such material; $\frac{50}{3.375}$ cu. ft. = 14.81 cents per cu. ft.) $27 \times 14.81 =$ $4.00 per cu. yd. County therefore could pay this price for processed material and it would not only equal the actual cost of the pit-run material but also would have the additional saving of quality or service and upkeep resulting from the use of properly graded aggregate prepared for a specific use.

This scale has been established on the basis of material retained on ¼-in. screen, because by so doing, the most logical and fair position from which to develop comparative figures is used. It is realized that there must enter a certain adjustment of the figures set forth to compensate for the allowances in specifications which permit of a small percentage of material minus ¼-in. However, it is suggested that in this connection proper consideration be given to the fact that the allowances mentioned do not originate from any consent which is founded on the necessity for any material minus ¼-in. being present, but rather that this does enter through a realization by engineers that there is a limit to the perfection with which processing can be carried out, particularly considered in the light of the deposits from which the material is taken for such processing.

terial, and he drew up a chart to see what the actual cost was in comparison with that provided for in the state specifications; which, though he may have favored them only slightly before, he is now firmly convinced should set the standard and apply in all the counties.

"What he brought forth as to a comparative price further opened his eyes and started him out to go into the handling and hauling of road material, and the places and purposes in and for which it was used. In this he also finds much to add to his balance in favor of the use of processed materials under a positive and definite specification, to further decrease the cost as compared with that being used by many of the counties.

"He has asked many questions concerning the reason for having such wide separation of interest present between the counties and the state when there should be such very close contact in order to carry out properly what it is to the best interest of the public so to do.

"It was a further shock to him, along with other things mentioned here, when he inquired if there were any instances where some counties made a practice of using the facilities of State Highway Department for any purpose and found out that this was not done except in very few cases; and that here again money was being expended where it could have been saved.

"Perhaps this taxpayer has not been impressed by the idea that the rugged individualism of himself and his neighbors created the depression. He now becomes oversold on the certainty that there can be no question as to the responsibility for the condition he finds here to exist being the direct result of true rugged individualism in divisions of government."

Institute of Mining Engineers Forms New Industrial Minerals Division

THE American Institute of Mining and Metallurgical Engineers has organized a new industrial minerals division, which will deal with rock products, clay products and non-metallic minerals other than fuel. Dr. Oliver Bowles, U. S. Bureau of Mines, is vice-chairman and J. R. Thoenen, U. S. Bureau of Mines, is secretary-treasurer. Both are well known to Rock Products readers through their work in this field. Dr. Benjamin L. Miller, Lehigh University, is chairman of the cement, lime and gypsum committee.

Sand and Gravel Association Appoints Committee to Combat Government Competition

THE National Sand and Gravel Association has appointed a committee to work with a similar committee of the National Crushed Stone Association as a joint group to combat government competition in the production of sand and gravel and crushed stone. The members of the sand and gravel committee are E. Guy Sutton, chairman; L. T. McCourt, R. J. Potts, Eric Ryberg and Wm. Stoner. This committee will have to contend with the most serious problem facing the industry in connection with the spending of the new five billion dollar public works fund—if successful they can prevent a lot of waste.

Combustion Economy in the Rotary Kiln*

Part 6—Combustion of Natural Gas

By Robert S. Schultz,
Consulting Engineer, Maplewood, N. J.

THE COMBUSTION of natural gas in the rotary cement kiln is a much more simple problem than the combustion of either pulverized coal or fuel oil. The gaseous character of the fuel greatly simplifies the problem of contacting the combustible with oxygen.

Analyses of a number of representative natural gases are given in Table IV. Practically all of the combustible consists of methane (CH_4) and ethane (C_2H_6) in various percentages. On ultimate analysis, all of these natural gases show high percentages of hydrogen. It is necessary, therefore, to use the "net" heat value of natural gases in all computations involving total available heat. The difference between the high and "net" heat values of these gases ranges between 9% and 10%.

The actual combustion of natural gas may be separated into two stages:

(1) The heating stage.
(2) The combustion stage.

The First Stage

The first or heating stage in the combustion of natural gas in the rotary cement kiln should include handling and preparation of the combustible mixture outside of the kiln and heating the gas and air to the ignition temperature inside the kiln.

The gaseous character of natural gas decreases the concentration of heat value as compared with solid or liquid fuels and its molecular form simplifies the problem of mixing with the necessary air. While these conditions make the problems of actual combustion more simple, they also increase the need for care in design of the burning system and in handling the combustible mixture. The factors to be considered are the inflammability of the combustible mixture, the rate of flame propagation, temperature of the combustible mixture and the ignition temperature of the gas. All of these factors have been determined experimentally by a number of investigators for a wide variety of conditions. The detailed results are given in several of the references tabulated at the end of this series of articles.

The inflammability of the combustible mixture depends on the composition of the gas and on the enrichment of the air-gas mixture. The composition of natural gas varies with its location, but since its combustible consists almost exclusively of methane and ethane, the limits for these simple gases may be taken as limits for natural gas. The limits of inflammability—percentage of gas in air by volume—for methane are, lower limit 5.3%, upper limit 14.0% and for ethane are, lower limit 3.2%, upper limit 12.5%. The limits for natural gas may be considered to lie between the above figures, when more exact data are not available.

The rate of flame propagation depends on the composition of the gas, the temperature of the combustible mixture, the enrichment of the air-gas mixture and the diameter of the burner pipe. Flame velocities vary over such wide ranges with variations in these factors that each case must be developed from its particular values. The temperature of the combustible mixture is of great importance when preheat is used. The increase in flame velocity with increased temperature is very rapid. For example: The maximum flame speed for methane at 60 deg. F. is one foot per second; at 500 deg. F., it is three feet per second and at 1000 deg. F., it is 7.4 ft. per second.

The ignition temperature of natural gas also varies with composition. It is not a fixed physical value, but is the temperature at which combustion becomes self-propellent. Considerable combustion occurs before the ignition temperature is reached. The ignition temperature of natural gas is high and can be considered as ranging between 1000 deg. F. and 1350 deg. F.

The high ignition temperature of natural gas is important since it permits an unusually high degree of preheat before the combustible mixture enters the kiln and leads to an extremely rapid rate of combustion and resultant high temperature in a short burning zone.

The actual heating stage of the combustion of natural gas requires the absorption of comparatively little heat, due to the low specific heat values of both natural gas and air. On the other hand, both of these materials are poor absorbers of radiant heat; and initial heating, prior to the beginning of combustion, appears to be largely by convection.

The Second Stage

The composition of natural gas is similar to that of fuel oil in that it consists of hydrocarbons, but these particular hydrocarbons are the lightest in this large chemical family and their tendency to break or "crack" is not as great and the reaction is not as rapid as in the case of the heavier hydrocarbons in fuel oils. They do "crack," however, into soot and permanent combusti-

*Part 1 was published in Rock Products for July, 1934, pages 38 and 39; Part 2, September, 1934, pages 36 and 37; Part 3, November, 1934, pages 24 and 25; Part 4, January, 1935, pages 18–21; Part 5, March, 1935, pages 32 and 33.

TABLE IV.—ANALYSES OF REPRESENTATIVE NATURAL GASES.

Location	Density sp. gr. Air = 1.00	Density lb. per cu. ft.	Constituents per cent by volume: Methane CH_4	Ethane C_2H_6	CO_2	O_2	N_2	Ultimate analysis per cent by weight: C	H_2	O_2	N_2	Heat value B.t.u. per cu. ft.: Gross	Net	Combustion cu. ft. air per cu. ft. gas	Theoretical flame temperature, F.
Methane (CH_4)	0.55	0.0421	100.0	....	..	..	..	75.0	25.0	...	...	1015	914	9.53	3630 deg.
Ethane (C_2H_6)	1.05	0.0804	....	100.0	..	..	..	80.0	20.0	...	...	1781	1631	16.68	3670 deg.
South California	0.64	0.0490	84.0	14.8	0.7	..	0.5	74.8	23.2	1.2	0.8	1116	1009	1047	3550 deg.
California (Los Angeles)	0.70	0.0536	77.5	16.0	6.5	..	..	69.2	20.2	10.6	...	1073	971	10.05	3550 deg.
Mid-Continental	0.57	0.0436	96.0	....	0.80	..	3.2	70.0	23.1	1.5	5.4	967	873	9.17	3590 deg.
Oklahoma	0.58	0.0444	95.2	....	1.3	..	3.5	69.0	22.7	2.5	5.8	959	865	9.05	3590 deg.
Texas	0.57	0.0436	98.0	....	0.7	..	1.3	72.4	24.0	1.4	2.2	988	890	9.31	3605 deg.
Arkansas	0.56	0.0429	99.2	....	0.2	..	0.6	74.0	24.6	0.4	1.0	1000	901	9.42	3610 deg.
Kansas	0.57	0.0436	98.0	....	1.2	..	0.8	72.5	23.9	2.3	1.3	988	890	9.31	3605 deg.
Missouri (Kansas City)	0.63	0.0482	84.1	6.7	0.8	..	8.4	65.0	20.7	1.4	12.9	974	879	9.13	3535 deg.
Louisiana	0.58	0.0444	96.5	....	1.4	..	2.1	70.5	23.2	2.7	3.6	973	877	9.18	3600 deg.
Alabama (Birmingham)	0.60	0.0459	90.0	5.0	..	..	5.0	69.4	22.5	...	8.1	1002	904	9.41	3565 deg.
West Virginia	0.56	0.0429	99.5	0.1	..	0.4	..	74.4	24.8	0.8	...	1012	912	9.56	3630 deg.
Ohio	0.65	0.0497	80.5	18.20	..	..	1.3	75.0	23.1	...	1.9	1131	1025	10.70	3550 deg.
Indiana	0.62	0.0475	86.8	6.2	0.8	..	6.2	67.1	21.6	1.5	9.8	984	888	9.28	3540 deg.
Pennsylvania	0.71	0.0544	67.6	31.3	..	..	1.1	76.2	22.3	...	1.5	1232	1120	11.70	3620 deg.
Pennsylvania (Pittsburgh)	0.61	0.0466	83.4	15.8	..	..	0.8	75.4	23.4	...	1.2	1129	1021	10.58	3562 deg.
New York	0.75	0.0574	59.8	37.6	0.4	..	2.2	75.0	21.5	0.6	2.9	1264	1149	11.92	3635 deg.

Analyses from: "Combustion," Amer. Gas Assoc., 3rd Edition and various sources. Data based on 60 deg. F. and 30 in. Hg. Weight of air = 0.07655 lb. per cu. ft. @ 60 deg. F. and 30 in. Hg. Flame temperatures corrected for dissociation.

ble gases at the high temperatures usual in kiln burning zones, if sufficient oxygen is not contacted.

The real problem in the combustion of natural gas, as with fuel oil and with pulverized coal, is the problem of contacting the combustible with oxygen.

Due to the gaseous character and the molecular state of the fuel, the problem of contacting is greatly simplified. Approximately 10 cu. ft. of air per cubic foot of gas are required for the complete combustion of natural gas. Reasonably homogeneous mixtures before admission to the kiln are both possible and practical. After admission to the kiln, the fuel and air expand rapidly and at approximately the same rates, thus greatly increasing the rate of natural diffusion. But in spite of all these advantages in contacting, a long, smoky flame can be produced with natural gas almost as easily as with the other fuels discussed. Intimate mixing and violent agitation produce a short, high temperature flame.

The luminosity of a natural gas flame, with adequate air for combustion, is very low, and heat radiation is less than for a corresponding luminous flame. It is desirable, therefore, in the combustion of natural gas in the rotary kiln, to secure maximum flame temperatures and thus overcome, at least partially, the decrease in heat radiation. The possibilities of increasing radiation through the inclusion of small quantities of clinker dust and, more particularly, of luminous combustible in natural gas flames has already been outlined.

(To be continued)

International Quarrying Conference

THE (British) Institute of Quarrying, of which a number of Americans are members, has decided to make its 1935 Annual Conference an international affair, and quarry owners and operators throughout the world are cordially invited. The Conference will be held at Bruxton, Derbyshire, England, June 17 to 21. Bruxton is the center of a considerable stone and lime industry.

The program includes many papers of interest and visits to local quarries, lime and cement plants. Already several quarry owners and specialists from various European countries have signified their intention to be present. Two Americans (it is hoped there will be many more) are to be present and are on the program. W. E. Farrell, president, Easton Car and Construction Co., New York City, is to speak on "Observations on the Crushed Stone Industry of America," and Dr. Oliver Bowles, U. S. Bureau of Mines, will speak on "Quarrying Limestone in America."

S. McPherson, secretary, The Institute of Quarrying, Salisbury Square House, Salisbury Square, London, England, will be glad to make arrangements for any reader of Rock Products who would like to attend the Conference.

Heat Balance of Rotary Kiln

WILLIAM N. LACEY, California Institute of Technology, and Hubert Woods, Riverside Cement Co., have contributed an article in the April issue of *Industrial and Engineering Chemistry* on "Heat and Material Balances for a Rotary Cement Kiln," which adds some interesting and helpful literature on this subject. A 9 x 7 x 102½-ft. dry process kiln was used in the tests.

The measured weights and the percentage analyses of the solid materials entering and leaving the kiln are as follows:

	Kiln Feed	Clinker	Treater Dust	Stack Dust
SiO_2	14.7	22 3	11 8	12 0
Al_2O_3	3.7	6.0	2.7	3.4
Fe_2O_3	1.4	2.2	1.3	1.2
CaO	43.6	63.8	56.3	55.7
MgO	3.6	5.2	4.1	4.5
SO_3	...	...	6.8	5.0
Loss	32.3	0.2	12.4	14.2
Total	99.3	99.7	95.4	96.0
Weight, lb. ..	79,670	4830		820

HEAT BALANCE

Heat Supplied	B. t. u.	%
Heat of combustion of fuel	340,300,000	98.9
Sensible heat of fuel	870,000	0.3
Sensible heat of kiln feed..	2,880,000	0.8
Total	344,100,000	
Heat Used and Lost		
Heat used in reactions	64,600.000	18 8
Sensible heat of clinker ...	46,850.000	13.6
Sensible heat of kiln gases..	166,500,000	48 4
Potential heat of combustion of CO	1,160,000	0.3
Latent heat of water from combustion	15,700,000	4.6
Heat lost through walls....	28,650,000	8.3
Heat not accounted for.....	20,640,000	6.0
Total	344,100,000	

BALANCE OF INGOING AND OUTGOING MATERIALS

Ingoing Materials

	16.	%
Fuel	18,445	4.5
Kiln feed	124,300	30.6
Moist air	264,000	64.9
Total	406,700	

Outgoing Materials

	16.	%
Clinker	79,670	19.6
Treater dust	4,830	1 2
Stack dust	820	0.2
Moist kiln gases.....	321,700	79.0
Total	407,000	

Cement

Santa Cruz Portland Cement Co., Davenport, Calif., is being sued by local artichoke growers for alleged dust damage. Twelve growers are asking a total of $350,000.

◆ ◆ ◆

Lehigh Portland Cement Co., Metaline Falls, Wash., has awarded a contract to S. G. Morin, Spokane, Wash., contractor, for the construction of 12 reinforced-concrete silos, 12½ ft.-diameter by 40 ft. high. It is reported that new mills for finer grinding will also be installed.

Chemists' Symposium on Building Materials

THE ANNUAL MEETING of the American Chemical Society in New York City, April 22-26, included an interesting symposium on building materials, under the chairmanship of Dr. James R. Withrow, Ohio State University. Among the papers read were the following of especial interest to Rock Products readers: "Concrete in Modern Home Construction," by R. E. Copeland, Portland Cement Association; "Portland Cements as Revealed by High Temperature Research Upon Their Components," by Dr. R. H. Bogue, U. S. Bureau of Standards, summarizing the results of his research work on the constitution of portland cement for the Portland Cement Association; "Portland Cement and Its Possibilities," by R. W. Carlson, Massachusetts Institute of Technology, giving an account of the major factors which influence volume change in concrete, followed by suggestions as to what attempts may best be made to control volume changes; increasing the efficiency of the cement so less can be used per cubic yard of concrete, was one of the suggestions offered; "Plastic Flow of Portland Cement Concrete," by J. R. Shank; "Reactions of Calcium Chloride with Portland Cement Constituents," by H. F. Clemmer—a study of data presented in the reports of numerous investigations showing that the physical properties of mortars and concretes are markedly affected by the chemical composition of the cements—a fact to be expected inasmuch as the individual cement constituents possess entirely different characteristics and their proportions in portland cement vary over wide ranges; a study of the reactions of calcium chloride with portland cement and its individual constituents indicates the beneficial effect of this compound in promoting the development of durable concrete structures inasmuch as it (1) increases the strength contributing value of the major portland cement compounds, the silicates, and (2) materially reduces the loss of moisture from concrete, and retards the hydration of the tri-calcium aluminates, thereby minimizing the occurrence of detrimental volume changes; "Structural Products of Gypsum," by Clarke F. Davis, Structural Gypsum Division of the American Cyanamid Co., giving a summary of the experimental application of precast gypsum units to the construction of a house recently erected at Montclair Heights, N. J.; "Waterproof Lime," by George B. Wood, Rockland and Rockport Lime Corp., describing his company's patented product; "Importance of High Lime Content Mortar for Leak Proof Masonry," by Frank Loftus; "Calcium Hydrosilicate as Building Material," by Dr. F. O. Anderegg, describing a new light-weight sand-lime product. There were many other papers of more or less general interest.

The Sand and Gravel Producer of the Future

By W. C. Torbett, Jr.
Superintendent, Romayor Plant, Texas Construction Material Co.

THE PRESENT PICTURE of the sand and gravel producer, so far as the public is concerned, is that of an operator who through the Government is being subsidized, helped, and fattened, and has nothing to do but load and ship, and collect his money. The general public (and some lines of industry) are not informed as to the technical operations and the advance in mining methods in this industry, and today they consider a gravel operator a person with no special amount of intelligence who was fortunate enough to have some land that had gravel on it, which could be loaded and shipped.

I have arrived at this opinion after several years of study and observation of individuals, from corporation officers to workingmen; so I feel as though something should be done to properly inform, or educate the public as to the magnitude and complexities of this industry. I have never seen or read anything pertaining to public information, except one small article in one of the Houston, Texas, newspapers, where an ambitious reporter set out to get some facts, and the best he could make of his article was about two inches of space on an inside page.

Editor's Note

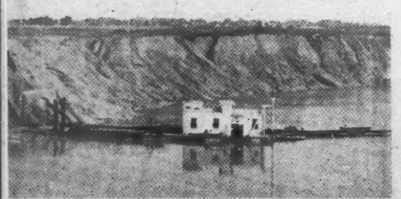
THE ILLUSTRATIONS we have inserted with Mr. Torbett's article show both sides of a circular recently mailed by the McGrath Sand and Gravel Co., which we think at least partly answers Mr. Torbett's criticisms of his industry. We are not in harmony with his criticism of present research work. We believe that adequate use of available data by individual producers as applied to their own product could be made to show its superiority over less carefully prepared materials, and, carried out in some such way as the McGrath company has in its circular, would do some of the educational work so much to be desired. The McGrath circular is in two colors — red and black.
—THE EDITOR.

How to Educate the Public

To start such a course of education, I think the first thing necessary is the coining of a word, as short as possible, that would designate this industry; then begin to educate the public as to its significance, along with the progress, importance and size of the industry. I take for my authority as to the justification for this course, a previous act of the real estate agents and corporations. For years, those men were called real-estate agents, real-estate sharks, or simply land sharks, and with such public opinion, they could not properly take their place in the business world. To overcome this, at a hot session at one of their conventions some years past, they adopted the term "Realtor," which was the beginning of a new era in their business. Today, they have climbed considerably in the public estimation, while the gravel and sand producers are still swimming around in the same old puddle, doing business as of old, and not preparing for the industrial place they should occupy.

By a proper educational program, the use of substitutes will be held to a minimum, as the tendency is to use local material, neither graded nor sized, if it can be found, for small jobs that otherwise should go to a producer. With the Government housing program taking shape, a large volume of busi-

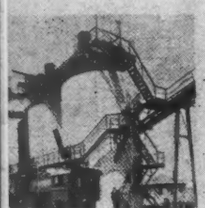
Views of McGrath Modern Plants



The raw material receives its first major washing through this modern 17-inch dredge, which has an hourly capacity of 600 tons.

De-watering unit and general view of the Chillicothe plant.

Whether your sand and gravel requirements are large or small, these modern washing plants offer you a perfected service.



The finished product is loaded from these concrete silos directly into cars and trucks.

A trainload of various sizes of washed and graded sand and gravel.

6 Washing PLANTS
1 . . . Forreston
2 . . Chillicothe
3 . . . . . Peoria
4 . . . . . Pekin
5 . . Mackinaw
6 Bloomington

McGRATH
Products Meet
EXACTING
SPECIFICATIONS

McGRATH
SAND & GRAVEL COMPANY, Inc.
Executive Offices - Lincoln, Illinois
Division Offices - Springfield, Illinois
Peoria, Illinois

tiess will be lost to producers if the public is permitted to believe that anything hard, or that is classed as concrete material, will make concrete for their work. There are tests and experiments being conducted by private interests today, trying to find substitutes for regular quality material; and with no active part being played by the producers, these substitutes will make serious inroads on the small less-than-carload orders, that local dealers should handle. With the natural handicap caused by the heavy freight expense on this material for small shipments, the producers are at a disadvantage, which can only be overcome by creating a desire for quality merchandise.

Not Getting the Right Kind of Research

I am opposed to the continued research that is being done by every State Highway Department in the nation along with the National Sand and Gravel Association, in that each research group is busy cutting down cement, curing, testing, and trying to make cheaper concrete for foundations and slab work. According to the information that I have received from time to time, that work is a duplication of efforts, and each unit is busy getting similar results along identical lines. This all looks to me like a useless duplication of efforts, and with the fact that the asphalt industry is trying to break into road construction, with its type of road, if successful, which in some places it is, then all of the years of research on concrete construction is wasted for the time being in that territory.

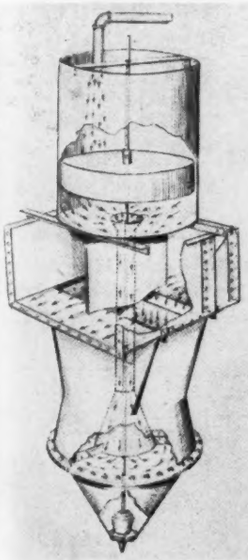
If data were available to show all the uses of the aggregates, from the producers, I believe that nearly 80% of the total tonnage of washed and sized material would be shown to go either for foundations or road construction; but the list of the uses of this material will consist of better than 25 items. We are in the same position as the person that is carrying all his eggs in one basket. Although the depression is lifting, and everyone is feeling more optimistic, I believe by diversification and the development of new markets and uses for these materials, a better balanced operation will result.

Too Easy an Industry to Get Into

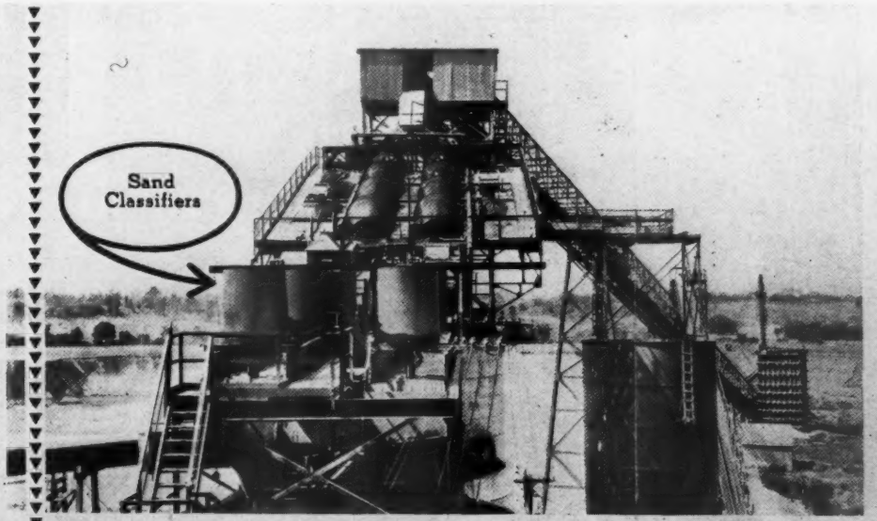
The mortality among gravel plants is high, and I understand that this industry is considered a bad risk in banking circles because of these failures. I can only account for this high percentage by the fact that misinformed individuals will see what looks like workable material to them, and organize a corporation to open up a gravel pit. They, not knowing the business, and still thinking in terms of the wagon and team days, do not realize the complexities of a modern operation, and the necessary preliminary surveys to determine the feasibility of the area under consideration for a plant operation; so another corporation is formed, to go to the wall, and another black mark is chalked up against the industry as a whole in banking circles. Education would offset this condition, the same as education among employes will reduce accidents; so this increased respect and rating in financial circles will go a long way toward placing this industry in the position it should occupy.

The Government and the Industry

For the success of the New Deal, the Government undertook to create permanent improvements over the country through the construction route, and so far as I have been able to determine, the size of this industry, and its potentialities, have been negligible in the Government figures, because, in a way, even the Government is not impressed with the size of this industry, as shown by the lateness of the code of fair competition, whereas the so-called major industries were acted on first, to try and help re-employment. If we had been working on a planned advertising program, showing the importance of this industry, we would be a recognized unit in the recovery plans of the nation.



This **Classifier** produces the cleanest sand and gives the most accurate sizing of any form of sand separator. It has created for us a new set of "sand values".



Sand Classifiers make up one of the most important units of a modern sand and gravel washing plant.

"The priceless ingredient of every product is the honor and integrity of him who makes it. Consider his name before you buy."

PROGRESS
In SAND and GRAVEL

McGrath Plants March On!

. . . . toward improved service
. . . . toward new highs in quality
. . . . toward countless new uses for McGrath Products
. . . . toward new efficiency in plant design and equipment.

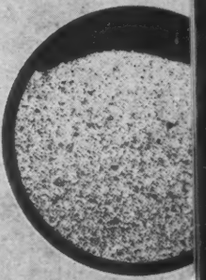
Today—Science Dominates

Experienced plant engineers are in charge of the McGrath Modern Plants. Here are the sizes produced:

Washed and Graded Sand—
Brick and Plastering Sand
Torpedo Sand
Engine Sand
Motor Sand
Bedding Sand—for stock cars
Filling Sand

Washed, Crushed and Graded Gravel
Screened ¼" to 2"
" ¼" to 1½"
" ¼" to 1"
" ¼" to ¾"
" ¼" to ½"
" Block Gravel—¼"—⅜"—½"
" Roofing Gravel
" Traffic-bound Gravel, all grades
" Bituminous Gravel, all grades

McGrath Building Sand, prepared, cleaned and blended through Link-Belt-Shaw Sand Classifiers. The color and blending of this sand denotes high quality—it may be imitated, but never equaled.



McGrath Washed and Graded—¼" to 1½"—Class X State Inspected Gravel. Measured by every test known to engineering science and practical usage, this gravel is recognized as a standard coarse

Modern truck scales and railroad car scales assure accurate weights on truck and carload ship-

Since we are mining natural resources, I can see no reason why the various units of Government should operate gravel plants, any more than they should drill oil wells and compete with the oil companies, unless it is because the oil companies have fought for their rights, and we, in this industry, have been satisfied to take the crumbs given us and be thankful.

This industry will either go forward or backward during the next decade—it cannot stand still—and with the depletion of our natural resources, if the utmost is made of each deposit, instead of taking the cream and abandoning the rest for greener fields, this industry will broaden out; otherwise substitutes, which are creeping in even today, will do to this industry the same thing that home refrigeration and natural gas have done to the local coal and ice dealers—strangle it to death.

With the thought that through progressive leadership and the belief that our industry is essential to the continued progress and growth of our country, I look toward the future with hopes for a broader field of operations, and a New Deal for our industry.

Depression Caused This Silica Sand Company to Make Improvements and Find New Markets

By C. R. Wolf,
New Jersey Silica Sand Co., Millville, N. J.

IMPROVEMENTS and changes have been made and are taking place on the property of the New Jersey Silica Sand Co., Millville, N. J., in spite of the depression. New equipment and machinery have been placed in operation to improve grades of sand and make a product for enlarged markets.

Fig. 1—The pit where the first car of sand was loaded by the company in 1921

This property was once the hunting ground of the Manumuskin tribe of Indians. The first sand shipped in 1921 was loaded with horse and cart, and was furnished to one of the largest steel foundries in the East.

Realizing that the property contained superior grades of silica sand and molding sands for the iron and steel foundries, washing plants and molding sand screens were installed to meet foundry specifications. For a few years the New Jersey Silica Sand Co. specialized in only the foundry grades of sand, but soon found it was able to compete with other companies furnishing glass sand, sandblast sand, pulverized silica, filter sands and various grades of molding sands and clay.

One of the major improvements during the last year is the completion of a wharf on the Maurice River for making sand shipments to all parts of the country. Other improvements are the completion of new washing plants and a large foundry gravel screen (Fig. 2). This screen replaced the one shown in Fig. 3, and is the largest and most modern screen for the preparation of molding sands for the foundries. A fine mesh manganese steel wire is used on this 7x22

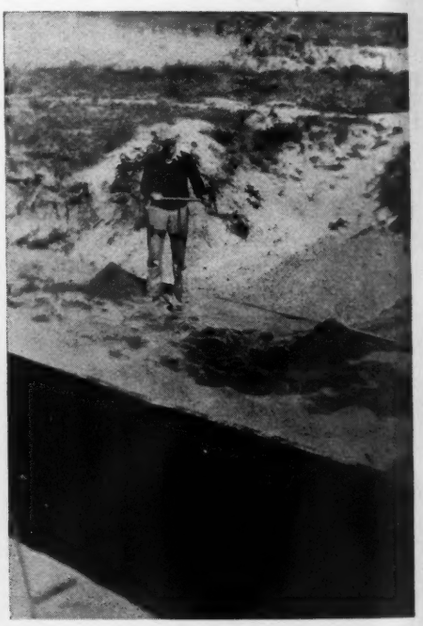


Fig. 4 — Method of taking laboratory samples of loaded cars before shipment is made—tests for permeability, green strength, screen tests, clay content, grain classification

Fig. 5—Quality and uniformity assured by nature of deposit and bench system of working it

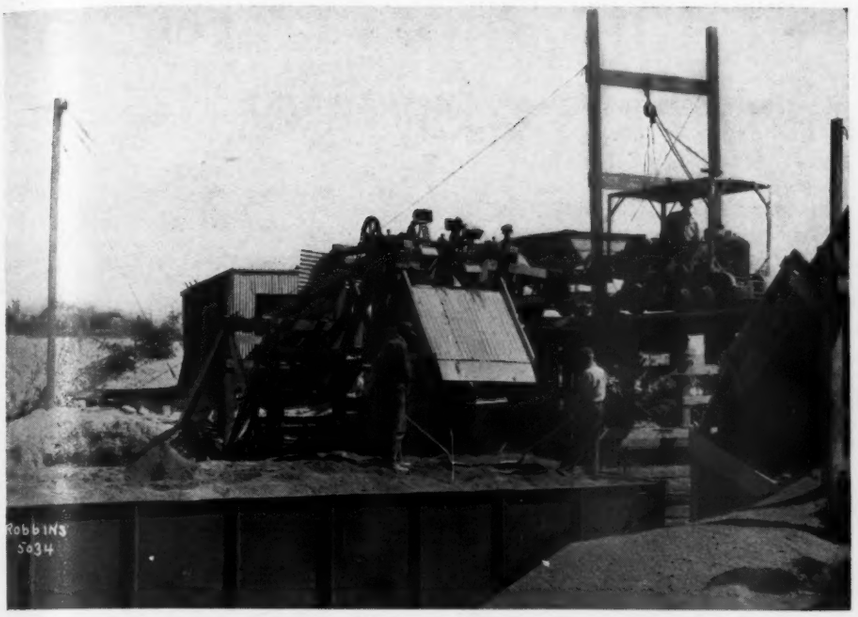


Fig. 3—Old type screen for preparation of foundry sand, replaced in 1934 by equipment shown below

ft. screen, which takes out more pebbles than was possible with the old type screen. Fig. 4 shows the method of taking a sample from the loaded car before the sand is shipped. Tests for permeability, green strength, grain class and clay content are made according to the American Foundrymen's Association methods. Uniformity can be assured due to the very uniform banks of the molding sands as shown in Fig. 5. There are 1200 acres now being mined.

Our office is located right at the plant. Personal supervision assures prompt and uniform shipments. Quality was demanded during the depression and it was no time to "cut corners" on plant equipment. New business was secured by proving that we were trying, at all times, to improve on quality.

Production of Aggregates by States, Counties and Cities

STATISTICS compiled by the U. S. Bureau of Mines (Current Aggregates Report, No. C.A.R. 21) for the year 1933 show that states, counties, municipalities and other government agencies produced 39% of all the crushed stone, sand and gravel accounted for. Most of this increased production of non-commercial aggregates was sand and gravel.

Of the 42,000,000 tons of aggregates thus produced by government agencies, the state highway departments produced 57%, the counties 37%, and the municipalities and other agencies 6%. The states themselves are thus proved to be the principal competitors of commercial producers. Prices (or costs) given by these agencies varied from 10c to 82c per ton. Less than one-third of the 42,000,000 tons was washed, screened or otherwise prepared. Most of it was used for secondary roads, apparently under little or no specification requirements.

Sand and Gravel

Paul Benbow, Wabash, Ind., has settled a $16,814 damage suit against the county commissioners for $5965. Several years ago Mr. Benbow obtained a contract from the commissioners for gravel. The commissioners were of the opinion that the contract called for payment of gravel used by the county road department. Mr. Benbow, however, contended that it called for payment of gravel dredged, regardless of whether it was used or not. He dredged 22,221 cu. yd. of gravel which the county refused to pay for, contending that it was of an inferior grade. The producer then filed suit against the county. Under the compromise, the county agreed to pay the sum of $5965. In addition it will pay Jacob Karn the sum of $1326.67 and Frank Humbert the sum of $2565.50. Karn and Hubert were the owners of the pits from which the gravel was taken at 25c a yard.

◆ ◆ ◆

Hal V. Owens, president of the National Sand and Gravel Association, president of the Eastern Rock Products, Inc., Utica, N. Y., is a tennis fan. So he has a new company, Cork Colprovia Co., which manufactures a tennis-court paving material made of cork aggregate and asphalt. The color of the mixture is dark green and it is said to make an ideal resilient, non-slippery surface, combining the best qualities of a grass and a hard-surface court. He reports a big demand for the product from many parts of the country.

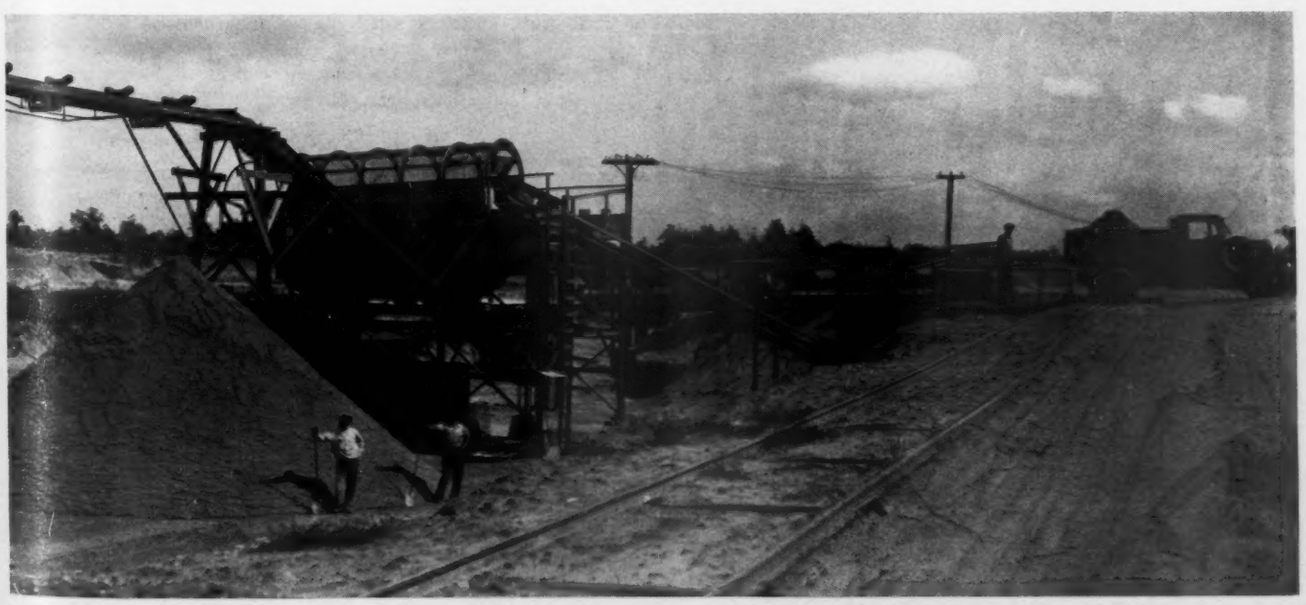


Fig. 2—Large modern screen for preparation of iron and steel molding sand—fine mesh manganese steel wire mesh; served from pit by motor trucks and industrial railway and gasoline locomotives; storage piles maintained for winter shipments

Development of Rip Rap Quarry for Harbor and River Projects

By Louis M. Cassayre,
Superintendent, Basalt Rock Co., Napa, Calif.

View of rip rap quarry of Basalt Rock Co.

Above: Shovel loading larger stones for direct conveyance to barges; Below: Waste material storage piles

A VERY IMPORTANT new addition to the business of the Basalt Rock Co., Napa, Calif., is the rip rap quarry. The new quarry is adjacent to the blue basalt rock quarry and was recently developed as an addition to the commercial plant. The stone is of different texture and is in larger fragments in its natural state in the hill. The size of the stone lends itself well to the purpose for which it is used. The increasing demand for stone of this type for harbor and river improvement in San Francisco Bay, Sacramento and San Joaquin Rivers was the reason for developing this quarry in the spring of 1932.

Many problems occurred in the construction and development of this particular part of the business, but they were met and overcome. Now the plan is complete and equipped to turn out an exceptionally fine quality of rip rap material. Some of the contracts called for the fines from 30 lb. down to be removed. This presented itself as a real problem, not so much from the process of handling the fines, but the method of handling the larger pieces. This called for the erection of a bunker to meet the required specifications.

Truck Loading Method

A section of the side of the hill was excavated below the level of the quarry floor, leaving a vertical bank against which the bunker was built. The bunker is a two-compartment type with a grizzly over the first compartment. The grizzly bars are movable and a change of openings can be made within a short time. A ramp leading from the quarry floor to the grizzly was built as a separate unit. The material passing over the top of the grizzly rolls into a semi-bunker and chute of 20 cu. yd. capacity.

The company operates five Auto-car dump trucks and two Mack trucks, all of which have open backs. The trucks back up to the loading chute, which is 12 in. smaller in width than the beds of the trucks. The chute with which the trucks are loaded is equipped with a hinged gate to control the feed. It is hinged to the bottom of the chute and the rocks are checked or released by raising or lowering the gate. A Thomas Elevator Co. hoist with a 30-hp. motor is used for this purpose.

The trucks are spotted so that when the gate first lowers, the rocks roll into the front end of the truck. The trucks then move forward and the rocks from the chute fill the truck to capacity. The gate is then raised and the flow of the material in the

Two-compartment bunker and chute

chute is checked. The construction of the chute is such that while the truck is being loaded, the truck acts as a check.

The Autocar trucks are equipped with a slightly raised extension on the rear end. This is a safety precaution against spillage while the material is being conveyed one and one-half miles to the barge loading ramps. One mile of the haul is over the company's property, while one-half mile is over a section of the state highway that leads to the famous "Redwood Empire" of northern California. The traffic on this line of travel is heavy, and spillage would be a serious thing.

In the quarry a Marion No. 37, all electric shovel, is used, with a 2½-yd. Esco bucket. While most of the material is run over the grizzly, all of the large individual stones are loaded on the truck for direct conveyance to the barge loading ramp.

Material from 300 lb. down is loaded for the grizzly. Two Mack trucks are used for this purpose. These back over the ramp which spans from the quarry level to the bunker, and material is dumped on the grizzly.

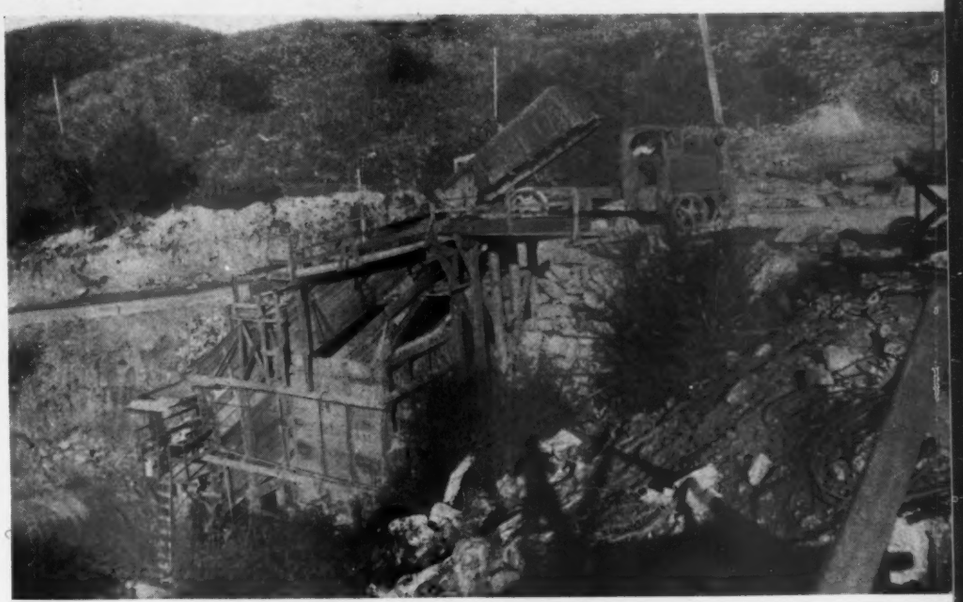
The through material falls into a bunker of 60 cu. yd. capacity. From the bunker it is fed into a 2-cu. yd. tram car with a trap door bottom. The tram line is a double-track design, and raises 3 in. to the foot. The car is pulled out over the line by a single-drum hoist with a 15-hp. G.-E. motor. The trap door is sprung at any point along the line by a trip which is set across the track cables. This method of storage is a new addition and has proved very satisfactory and economical. Formerly, the material was removed by trucks. This new addition was designed and built by the company at its own shop. For local truck delivery a bunker with a 30-cu. yd. capacity was built under this tram line, and when in use the bucket is unloaded into it.

Barge Loading

On the banks of a channel leading into the Napa River, the company has two barge loading ramps. When loading stone of two different sizes, this is a very desirable feature. Particularly is that true with jetty projects where fine material for the core and large pieces for face rock are used.

In addition to the ramps, a wharf running parallel to the channel is used as a runway for a Northwest crane. A well reinforced 1¼-yd. Owens clamshell bucket is used for handling the large pieces of face rock. The large stones loaded direct into the trucks in the quarry are dumped along the length of this runway within reach of the crane. They are picked up, one at a time, and placed on the barge. The average weight of stones handled in this manner runs between 1000 and 6000 lb. While material was being furnished for the San Francisco-Oakland Bay Bridge, 45,000 tons of material was loaded by this method. The average time to load a barge of 500 tons was between six and eight hours. Two tug boats, with 125-hp. Diesel motors, and five barges are operated by the company for the purpose of conveying the material to its destination.

Since opening up this quarry, 450,000 tons of material has been removed. During the year 1934, 250,000 tons of rock was removed by George Pollack & Co., of Sacramento, for the jetty extension at the United States Government Navy Yard at Mare Island.



Quarry truck dumping on grizzly

Above: Truck dumping direct on barge and crane loading larger pieces. Below: Ramp No. 2

Plain Facts About Silicosis and Its Hazards to the Rock Products Industries

(Contributed)

WHETHER OR NOT he believes the contraction of silicosis by his employes to be an actual possibility, every employer in the rock products industry should have a general working knowledge of this disease and the accompanying hazards.

Some 86 industries having to do with dust of one kind or another are genuinely alarmed, and they have good cause to be since suits now pending against them claim damages aggregating more than $50,000,000. The fact that there are no reasonable grounds for many of these suits does not change the fact that they are a real menace—and may be won by the plaintiffs unless intelligently defended.

Not a few defendant companies have settled doubtful cases rather than risk court trials, largely through fear of the unknown. Every "racket" case settled is likely to beget another. In the last analysis these cases must be fought out to a conclusion and the hope of the defendants lies largely in a clear understanding of silicosis and the hazards which surround it. No interested employer should make the mistake of assuming that it is sufficient for his medical and legal advisers to comprehend this disease and the ramifications of the "racket" which have been built up around it.

As of benefit to those who would like to become better acquainted with their silicosis problem—"know their silicosis" as it were—let us consider some of the more general phases of the matter, reduced so far as possible to non-technical terms.

Silicosis is defined by the American Public Health Association as follows:

> Silicosis is a disease due to breathing air containing silica (SiO_2) characterized anatomically by general fibrotic changes and the development of miliary nodulation in both lungs, and clinically, by shortness of breath, decreased chest expansion, lessened capacity for work, absence of fever, increased susceptibility to tuberculosis (some or all of which symptoms may be present) and by characteristic X-ray findings.

Reference to *silica* does *not* mean silica as reported in the routine chemical analyses (which include silicates and other silica compounds) but is *limited strictly to the crystalline and amorphous forms of silicon dioxide* (SiO_2). The crystalline form occurs frequently as quartz. The amorphous form occurs quite commonly as chert or flint.

Silicosis is a specific form of pneumoconiosis.

Pneumoconiosis

Pneumoconiosis (sometimes referred to as pneumonoconiosis) means "dusted lung." When the term was invented by Zenker, a German pathologist, it was intended to define a condition, not a disease; it does not indicate the kind of dust responsible for the condition. To many it continues to merely define a condition of the lungs while others refer to pneumoconiosis as a disease. Dorland's American Medical Dictionary calls it "a lung disease due to the inhalation of minute particles.'

Silicosis and asbestosis* are the *specific types* of pneumoconiosis which are commonly and generally recognized as diseases. (There are other pneumoconioses in which rock products producers are not interested, such as anthrocosis and aluminosis.)

Excepting truly toxic (poisonous) substances, such as certain lead and arsenic compounds, the *only* industrial dusts known to be disabling are those which produce silicosis and asbestosis, mentioned above. It is evident, therefore, that so far as the rock products industries are concerned, the only type of pneumoconiosis likely to be disabling is the one which might be more specifically defined as silicosis.

Physiological Reactions to Dust

Reactions of various dusts have been clearly demonstrated by introducing them into experimental animals. In one such study, serial X-rays of the lungs, taken at 30-day intervals, showed at the end of 90 days that three types of reactions take place. Dusts including calcite, limestone, gypsum and cement were completely absorbed and caused no further concern. Quartz, chat and flint produced a proliferative reaction (an increase of fibrous tissue); soapstone, carborundum and coal were inert and remained without affecting function. Only dusts containing a *high free silica content* exhibited silicosis producing qualities.

In explanation of the above it may be stated that the effect of silica dust is not to set up a general diseased condition. If injected into the body tissue in sufficient quantity it causes a local reaction; if breathed into the lungs in sufficient quantity and over sufficient period it causes silicosis, but its effects are limited to the lungs.

Diagnosing Silicosis

The definition of silicosis quoted above states some of the clinical symptoms and refers to characteristic X-ray findings. How can the presence of silicosis be positively determined? Leading authorities on silicosis agree that all three of the following are necessary to positively identify silicosis:

(1) A reasonably complete occupational and medical history of the individual case.

(2) A careful and complete physical examination, preferably by a physician who, from actual experience, knows the healthy as well as the diseased chest.

(3) X-ray pictures. *These are not dependable as a means of diagnosing lung pathology unless expertly taken and studied with the aid of* (1) *and* (2).

Effects of Silicosis

Silicosis is not a recent disease. It was known centuries ago, and has been the subject of constant investigation and study in Europe, South Africa and the United States since about 1900. It has been known under various names in the different industries where exposure occurs.

Its effects are chiefly to promote fibrosis (which decreases lung capacity and leads to shortness of breath) and to lessen resistance to tubercular infection. Advancing years bring a normal increase in fibrous lung tissue and so far as this symptom is concerned, silicosis merely adds to the natural pathology.

Even a silicotic who has reached the state where he is somewhat short of breath may perform all of his accustomed duties and enjoy a normal existence, but with a considerably higher probability of contracting tuberculosis. There is no competent medical testimony to show that silicosis predisposes

*As its name implies, asbestosis is attributed to the inhalation of asbestos dust.

Editor's Note

THE ILLUSTRATIONS with this article show what has been accomplished recently to reduce the silicosis hazard in one of the country's largest and most important silica producing districts—that near Ottawa, Ill. Here the introduction of dust eliminating and dust removing, modern equipment, plus shorter work days, have tremendously decreased, if not entirely eliminated, the previous hazard—at least so far as it seems possible to do.

Producers in this section, naturally, have been victims of racketeering lawsuits, but on the other hand there have been, of course, authentic cases of silicosis. Here silicosis is a common topic of discussion; even the most poorly educated workmen and the children know something about it. The producers are anxious to do everything possible to protect their workmen from any hazard for every reason, humanitarian as well as economic.

Their experience has been similar to that described in the accompanying article—that most cases of serious pulmonary disease have been found to have a hereditary tendency to tuberculosis.

—THE EDITOR.

to heart disease. Likewise, there is no reason to believe that silicosis increases the incidence of cancer. Cancer is on the increase, but in non-dusty cases almost exclusively.

When it is discovered that a worker has silicosis he should be removed from the hazard, or the latter removed from him. In the earlier stages, the disease may remain at the point reached without making further progress; in later stages it may continue its progress indefinitely after exposure ceases.

How Silicosis Is Acquired

The incidence and progress of silicosis is dependent primarily on the extent to which silica dust is breathed. This disease seems to have little preference as between races and ages except that it acts more rapidly and more severely on individuals afflicted with tuberculosis and races or classes more prone to tuberculosis. Negroes, known to have less resistance to tuberculosis, are to that extent more sensitive to the effects of inhaled silica dust. The principal exposure factors are:

(1) Composition of dust in the breathing atmosphere—proportion of SiO_2 present.
(2) Size of dust particles.
(3) Concentration or density of the dust.
(4) Duration of exposure.

Composition: Dust, *per se,* even in heavy concentrations, does not cause silicosis. The danger is limited entirely to the presence of SiO_2. *Calcium* present with the silica is believed by many to be helpful in arresting the incidence and development of industrial tuberculosis. In a series of investigations where the proportion of silica dust was high but where *clay* was also present, it was shown that there was little if any silicosis; at nearby grit-stone quarries with approximately the same concentration of free silica (but no clay), the silicosis rate was notoriously high.

Type of respirator used by workers in the Ottawa Silica Co. plant, Ottawa, Ill.

Size of Particles: SiO_2 particles above ten microns in greatest dimension (10/25,000 of an inch) do no harm and particles above three microns do very little harm. Particles above 10 microns drop rapidly in the air; even when inhaled they seldom reach the lung proper. It is the particles under 3 microns in size which enter the lungs readily and because of large surface area in proportion to their volume, dissolve and react chemically much more rapidly than larger particles.

Concentration: Silicosis does not necessarily follow the mere inhalation of silica dust. Everyone breathes a great deal of it. Injury is dependent on exposure to sufficient concentrations of SiO_2 of harmful size over sufficient periods of time and the physical condition of the exposed individual.

Authorities agree that continual exposure to 5 million particles of free silica per cubic foot, all below 10 microns in diameter, is not harmful. Dr. Albert E. Russell of the U. S. Public Health Service has stated: "The deleterious effects of dust containing 35% quartz are caused by concentrations of not less than 20 million particles to the cubic foot, of particles 10 microns or less in diameter."

Period of Exposure: Rarely, even in concentrated exposures, does silicosis occur in less than five years. Most silicosis cases develop only after 15 to 25 years of exposure, according to the best medical sources. Natural protective devices of the respiratory system continue indefinitely to dispose of light concentrations of free silica; it is when these devices of nature are heavily overloaded over sustained periods that harmful effects are discovered.

Silicosis Suits

The present plague of silicosis damage suits in the dusty industries does not mean

Silica dust elimination really begins with the design of the plant itself; this is the most modern plant in the Ottawa silica district, and it can be truthfully said that it was built around the screening operation, which was designed for a maximum of safety to workers; every mechanical device to reduce the dust hazard has been employed here

Interior of the plant "C" of the Ottawa Silica Co., the exterior of which is shown on the preceding page; steel enclosed tubular bag type filter dust collectors

that silicosis has suddenly grown more prevalent or that its effects are any more apparent. It is believed that few such suits would have been filed had not the depression come along to close factories and throw men out of work. Idle workers lend themselves more readily to the advances of "runners" for lawyers who capitalize on such situations. Defendant employers have stated that most of the pending suits against them would be dropped if they could offer employment to the plaintiffs.

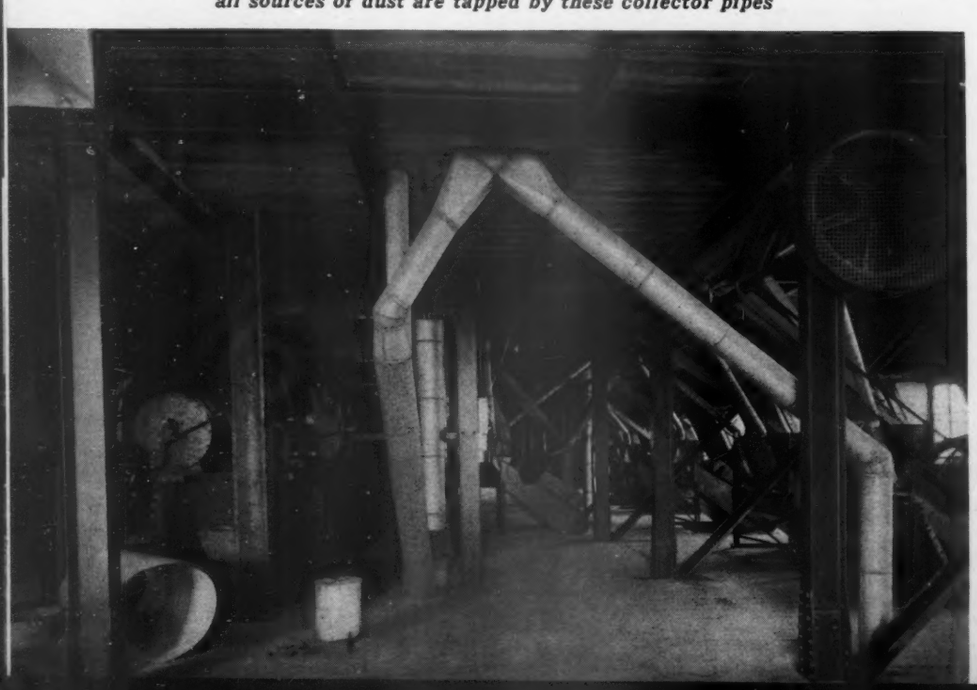
Plaintiffs' lawyers are surprisingly well informed as to the causes and nature of silicosis. The improbability, if not impossibility, of this disease occurring as a result of any given employment seems to have little weight with them. These suits often scare uninformed and unprepared defendants into making settlements; they frequently impress sympathetic lay juries, often incapable of comprehending the involved medical aspects and technical details.

Suits that have been filed commonly allege contraction of one or more of the following as entitling them to damages:

(1) All lung disability.
(2) Silicosis.
(3) Occupational illness.
(4) Injury to chest and lungs.
(5) Pneumoconiosis.
(6) Pneumonia.
(7) Tuberculosis.
(8) Bronchitis.
(9) Peri-Bronchitis.
(10) Influenza.
(11) Chalicosis.
(12) Siderosis.
(13) Bronchiedasia.
(14) Bronchiectasis.

It should be noted that of this entire list, silicosis is the only disabling ailment caused by dust exclusively of occupational origin. *If a plaintiff doesn't have silicosis he couldn't have a disabling pneumoconiosis.*

Another interior view of the Ottawa Silica Co. plant showing inlet pipes to dust collectors; all sources of dust are tapped by these collector pipes



Defendants' Examinations of Plaintiffs

It is usually possible to obtain quite a complete and dependable physical examination of a plaintiff, but it is a much more difficult matter, although fully as important, to get his complete occupational and medical history. Without the information revealed by a thorough examination and a fairly complete history, X-ray readings are not dependable. Quack medical testimony in such cases may be easily built upon "interpretations" of X-ray films without reference to physical examinations or case history.

Dr. Eugene Pendergrass of the University of Pennsylvania, a leading X-ray specialist, recently exhibited a collection of X-ray pictures showing healthy chests, miliary tuberculosis, normal fibrosis and certain non-dusty disorders. While none of these chests had been exposed to silica dust, all of the pictures might be diagnosed as silicosis in one stage or another had they been accompanied by case histories indicating exposure to free silica. Some of his pictures illustrated how a slight variation in X-ray technique could change a healthy chest picture to one indicating silicosis. He also demonstrated distortions and abnormal shadings of pictures due to use of under-powered X-ray apparatus.

Statements by leading specialists abundantly support the statement that X-ray pictures produce proof of silicosis *only* when interpreted by an experienced specialist in connection with physical examination and occupational history showing sufficient exposure to SiO_2 dust.

Dr. A. J. Lanza of the Metropolitan Life Insurance Company, who was one of the earliest investigators of silicosis in the U. S. Public Health Service, recently explained that physicians, including many who specialize on chest, seldom examine carefully a healthy chest; their attention is devoted to diseased chests. Dr. Lanza explained that a positive diagnosis requires one who knows, by extensive first-hand experience, the wide normal variations of the healthy chest.

Leading specialists agree generally that X-ray pictures alone cannot be used to determine disability.

Occupational History

In making an occupational history it is not sufficient to record employment in dusty occupations or exposure to dust hazards in terms of years. A good history should reveal:

(1) Period worked for each employer from the first.

(2) If employed in any dusty business, in what operations and capacities and how long in each; source of the dust.

(3) If employed in capacities exposing to considerable concentrations of dust, how steady (how many weeks per year, how

many days per week, how many hours per day) was exposure to this dust.

(4) Period worked in every different capacity in your company. (Actual years, weeks, days and hours worked.)

(5) Names of physicians who have examined him at any time. History of any known tuberculosis (himself or family).

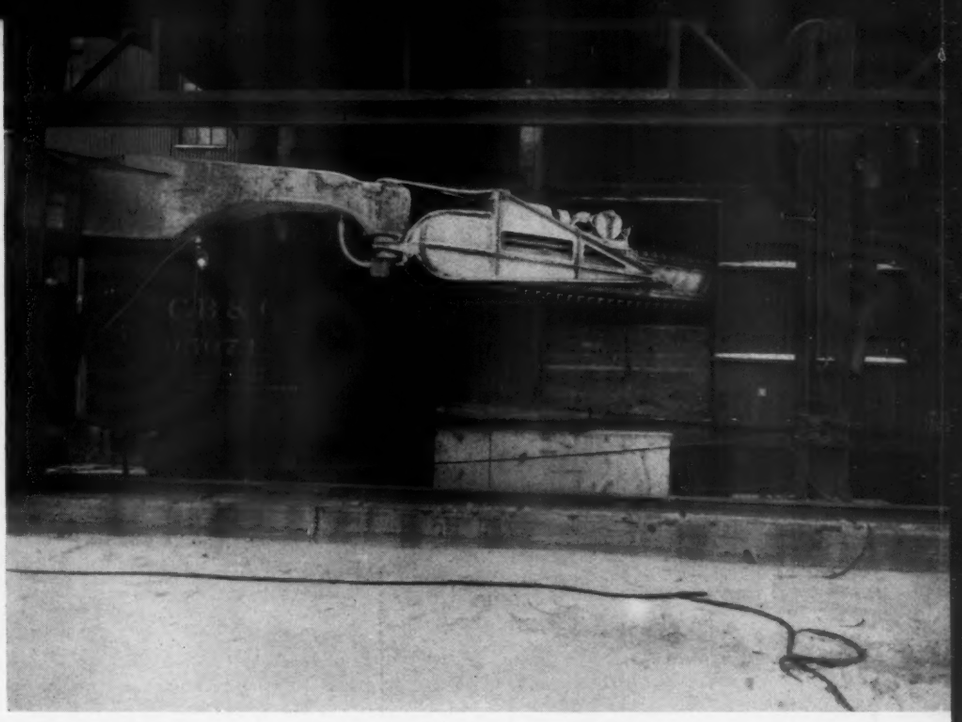
Dust Data

The approximate range of the free silica (SiO_2) content in various industrial dusts is shown in the following table, provided by Dr. J. J. Bloomfield of the U. S. Public Health Service.

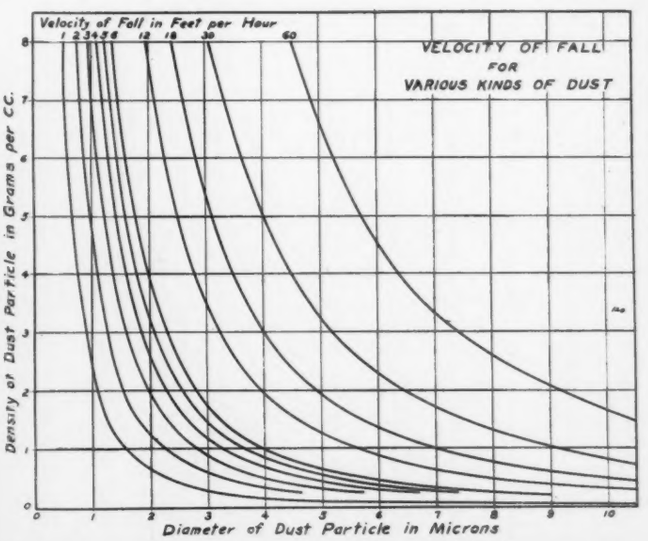
TABLE I.
PERCENTAGE OF QUARTZ PRESENT IN VARIOUS INDUSTRIAL DUSTS.

Kind of dust	Percentage of quartz
Rock-drilling dust (bituminous-coal mine)	54.0
Granite-cutting dust	35.2
Rock-drilling dust (anthracite mine)	31.0
Brass-foundry dust	19.0
Dust from raw mills in cement plant	6.5
Slate-mill dust (Vermont red slate)	3.0
Silverware-polishing dust	1.7
Anthracite dust	1.5
Bituminous-coal dust	1.2
Cement dust	less than 1.0
Slate-mill dust (Vermont green slate)	Trace
Talc-mill dust	None
Marble-cutting dust	None

Usual procedure to determine the proportion of SiO_2 in a given dust is by petro-

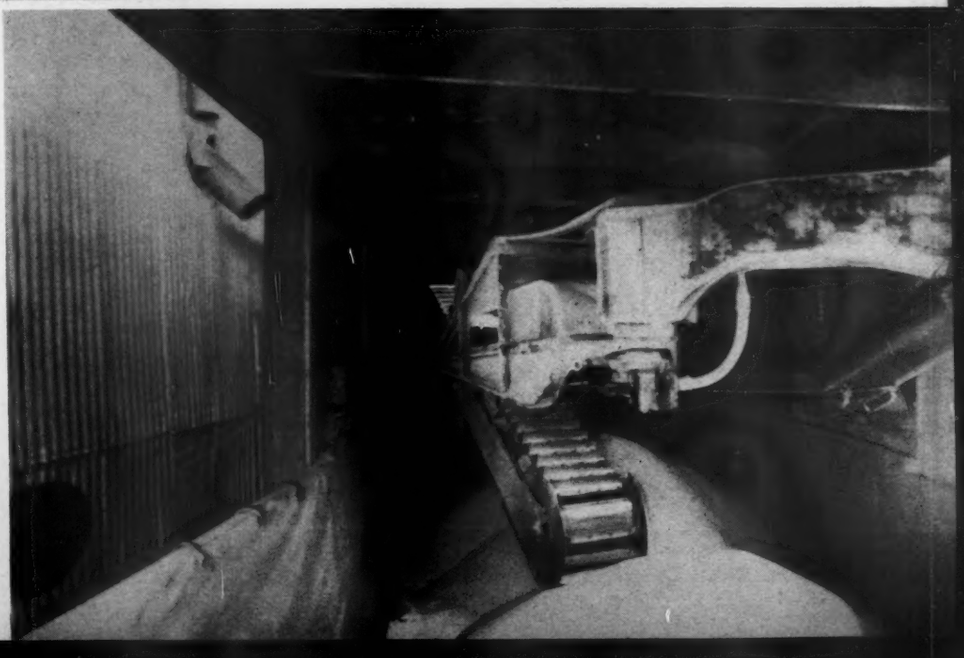


Especially designed box car loader used at the Ottawa Silica Co. plant; operated from a enclosed crane cab so that no workman has to enter or be near the entrance to the ca while loading


Velocity of Fall in Feet per Hour
1 2 3 4 5 6 12 18 30 60
VELOCITY OF FALL FOR VARIOUS KINDS OF DUST
Density of Dust Particle in Grams per C.C.
0 1 2 3 4 5 6 7 8 9 10
Diameter of Dust Particle in Microns

Falling rates of dust of various micron sizes showing how only very fine dusts are dangerous

Above: Type respirator in which fresh filtered air is supplied the worker through hose lines; automatic reel which permits movement about the plant is shown in upper left-hand corner; used at the Wedron Silica Co. plant, Wedron, Ill.; at right, another view of Ottawa Silica Co.'s box car loader



graphic analysis "checked" by chemical determinations at intervals. The petrographic method involves an actual counting of the particles of a sample under polarized light with a powerful microscope by which it is possible to identify the silica particles and determine the proportion of the latter to the total number of particles present. Samples used for this purpose are usually obtained by scraping off ledges or shelves at breathing height.

Size frequency of various dusts is shown interestingly by the following table, provided by Dr. R. R. Sayers, surgeon in charge, U. S. Public Health Service.

The accompanying curve indicating the velocity of fall of various kinds of dust, also provided by Dr. Sayers, brings out quite clearly an excellent reason why particles above 10 microns in diameter are practically harmless: These larger particles do not remain floating long at breathing height. Take for example, a rock dust with a density of 2. Particles 10 microns in diameter fall at a rate greater than 60 ft. per hour, while particles 3 microns in diameter fall at about one-tenth that rate. Heavier dust particles of corresponding sizes have the same differences in rate of fall.

Employment Examinations

Under existing laws, a plaintiff alleging silicosis disability usually brings action against his *last* employer, charging him with responsibility for the alleged damage. This situation is the same whether the action is at common law or under a compensation law. It is not likely that the minimum period of exposure necessary to contract silicosis will be sufficiently established for some time at least to protect "last employers" even when the plaintiff has been employed by the latter over too short a period to have contracted the disease.

Enclosed screens at plant of Standard Silica Co., Ottawa, Ill.; dust collector pipes here are connected to the elevators, which make the screens operate in a partial vacuum

TABLE II.

SIZE-FREQUENCY DISTRIBUTION OF VARIOUS INDUSTRIAL DUSTS AS COMPARED TO OUTDOOR DUST.

Kind of dust	Number of samples	Median	Average frequency in per cent—Size group in microns: 0 to 0.49	0.5 to 0.99	1.0 to 1.49	1.5 to 1.99	2.0 to 2.49	2.5 to 2.99	3.0 to 3.49	3.5 to 3.99	4.0 to 4.49	4.5 to 4.99	5.0 to 5.49	5.5 to 5.99
Outdoor dust	179	0.5	56.0	41.0	2.5	0.5	...	...	...	...	...	...	...	...
Sandblasting	9	1.4	1.4	19.7	34.7	20.3	12.6	5.2	2.8	1.6	1.1	0.2	0.2	0.2
Granite cutting....	4	1.4	2.0	19.0	33.6	24.5	10.4	4.6	3.1	.6	.9	.3	1.0	...
Trap rock milling:														
Crusher house ..	1	1.4	0	13.0	39.0	33.0	10.5	2.5	2.0	...	...	...	...	...
Screen house ...	1	1.3	2.0	31.5	33.0	16.0	10.0	4.5	2.5	.5	...	...	...	...
Disk crusher	1	.9	10.0	48.0	31.0	6.0	3.0	1.0	1.0	...	...	...	...	...
Foundry parting compound	2	1.4	0.5	22.0	42.0	17.3	9.2	5.0	1.5	2.0	.5	...	...	...
General foundry air	1	1.2	0	26.0	48.0	17.0	8.0	1.0	...	...	...	...	...	...
Talc milling	1	1.5	0	16.0	32.0	20.0	13.0	7.0	5.0	2.0	2.0	2.0	0	1.0
Slate milling	1	1.7	1.0	13.0	29.0	17.0	14.0	14.0	6.0	4.0	1.0	0	1.0	...
Marble cutting	1	1.5	0	12.0	37.0	21.0	10.0	11.0	3.0	0	1.0	2.0	2.0	1.0
Soapstone dust ...	2	2.4	1.2	16.0	19.0	13.0	11.0	6.0	6.5	4.5	5.5	3.3	2.5	11.5
Aluminum dust ...	1	2.2	3.0	8.0	20.5	14.0	11.5	9.0	6.5	3.0	3.5	4.0	7.0	10.0
Bronze dust	1	1.5	1.0	12.0	33.5	25.0	21.0	6.0	1.5	...	...	...	...	...

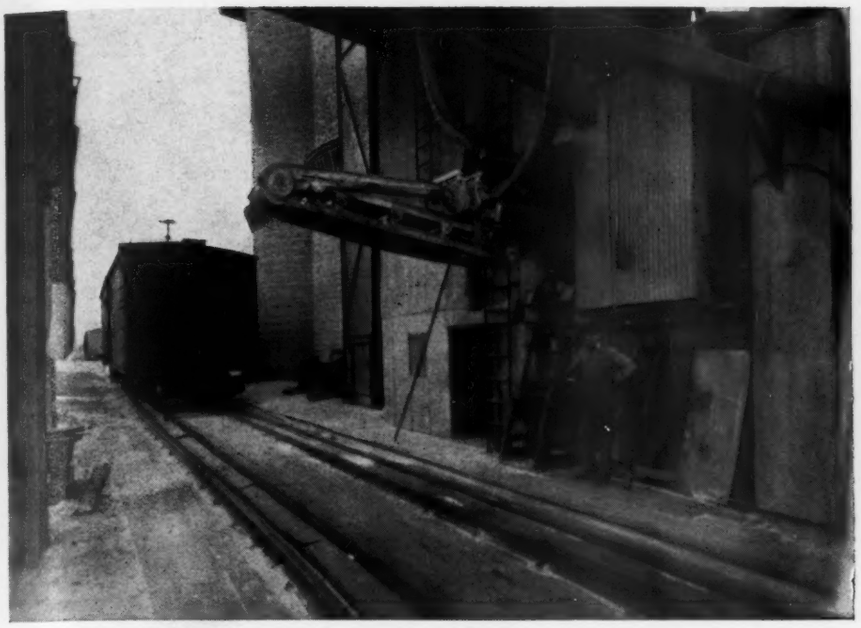
A third type of respirator with air filter at plant of the Standard Silica Co.

Therefore it may prove expedient for employers to examine all new employes before hiring them, in order to make sure that no persons having either tuberculosis or silicosis (in any stage) are employed.

It has been urged that if tubercular persons are not employed the greater part of the silicosis hazard will have been avoided. This position is based on the known fact that tuberculosis sufferers contract and progress through the various stages of silicosis much more rapidly than the non-tuberculars. Tubercular persons are open to objection on other good grounds including the protection of present non-tubercular workers against tuberculosis.

Some recent studies seem to indicate that there is a great deal of difference between individuals as to the effectiveness of the natural protective devices against the passage of dusts into the lungs and a corresponding difference between persons as to probable danger from exposure to silica dust concentrations.

A study recently reported in the *Journal*



Box car loader used at the Wedron Silica Co. plant; this is now a standard piece of equipment; like the one previously illustrated it eliminates the necessity of workmen being in or about a car while loading

of Industrial Hygiene indicates that (1) "the filtering efficiency of the nose among a varied group of men lay between 10 and 70 per cent and (2) the systematic study of 426 miners, some of whom were silicotic, showed that those with poor nasal filtration had far greater susceptibility to silicosis than did those with good nasal filters."

It is quite important that workers be examined at termination of their employment as a protection against suits at some future time.

Employe Education

A general understanding of the facts about the silicosis hazard by employes of the dusty industries might be very helpful. It would put at rest the anxiety which many workers feel—although without justification—at present. Employes who learn how they may continue indefinitely to hold jobs in the industry with which they are experienced, without disability from dust sources, and who are made acquainted with the impositions practiced by racketeer lawyers, would be far less likely to lend their names to dishonest suits.

Informed workers might even help in driving out or bringing to justice these racketeers. This is a situation in which employers and employes must stand together against a very dangerous common enemy from without. *Labor* is likely to be harmed far more by fictitious suits than is *industry*. Here are some of the ways:

The worker who lends himself to a fictitious suit receives unfavorable publicity and loses the respect of his fellows; he swears that he has received permanent injury and thereby admits that he is worth less as an employe; no informed employer will dare to hire him; unless his case is won—possibly through several courts—he receives no award; if he wins his case he rarely receives more than a fraction of the amount sued for; as a windup, if he has perjured himself, he may be guilty of a crime punishable under the statutes.

If workers continue to bring suits against employers for silicosis it is reasonable to assume that the latter will be driven, as a matter of protection, to require satisfactory previous occupation record, a searching physical examination and a clear X-ray picture of the lungs as a pre-employment requirement for every employe.

This would be disastrous to hundreds of able and deserving men who are not fitted for any other work.

Legislation

Both employers and employes in industries which have a real silicosis hazard undoubtedly will want silicosis included in occupational disease compensation laws. Silicosis and possibly pneumoconiosis as well, will be made compensbale in the various states soon.

Since the positive detection of silicosis and the degree of possible disability are matters requiring unusual medical experience and competence, legislation making silicosis compensable should place these determinations in the hands of small boards selected by state or county medical societies or similar non-political groups and preferably chosen after participation in competitive examinations.

Rock Products News

National Gypsum Co., Buffalo, N. Y., according to M. H. Baker, president, finds substantial improvement in earnings for the first quarter of 1935 and the probability of better earnings in 1935 than in 1934. Business volume is ahead of last year, he said.

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Marietta Concrete Corp., Marietta, Ohio, has sold its asphalt paving mixture plant at Zanesville, Ohio, to J. I. Hurst, Indianapolis, Ind. It will be incorporated as the **Muskingum Valley Asphalt and Supply, Inc.**

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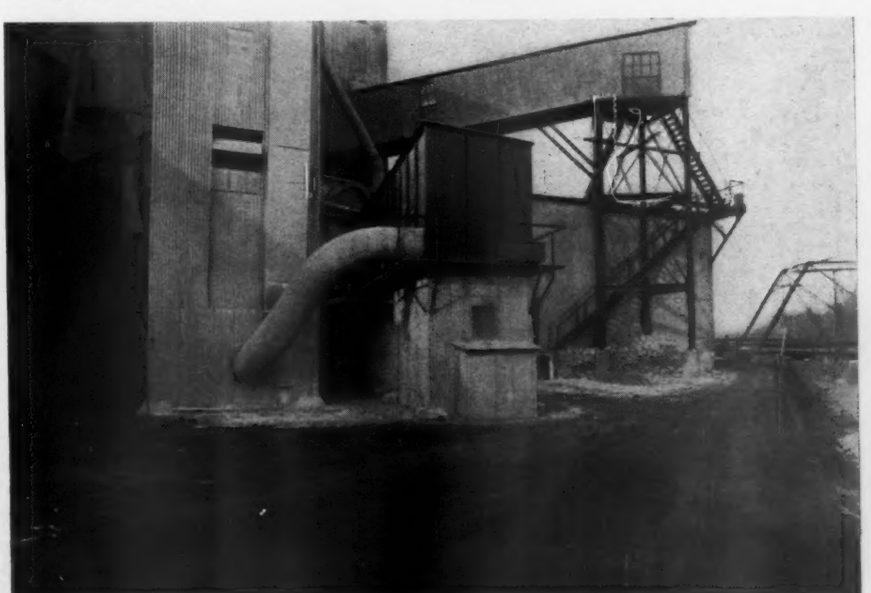
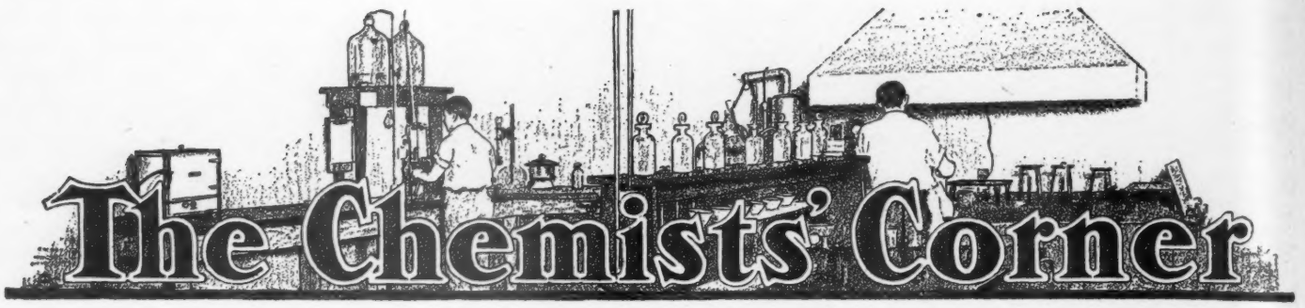
Cement

Alpha Portland Cement Co., Easton, Penn.; at annual meeting April 18, stockholders elected F. G. McKelvy, president, and G. S. Brown, chairman of the board of directors. Hitherto Mr. Brown has been president and Mr. McKelvy vice-president in charge of production, and more recently executive vice-president. The position of chairman of the board was created for Mr. Brown.



Standard commercial type dust collector at the plant of the Wedron Silica Co.



CONSTANT TEMPERATURE ROOM FOR CEMENT TESTING

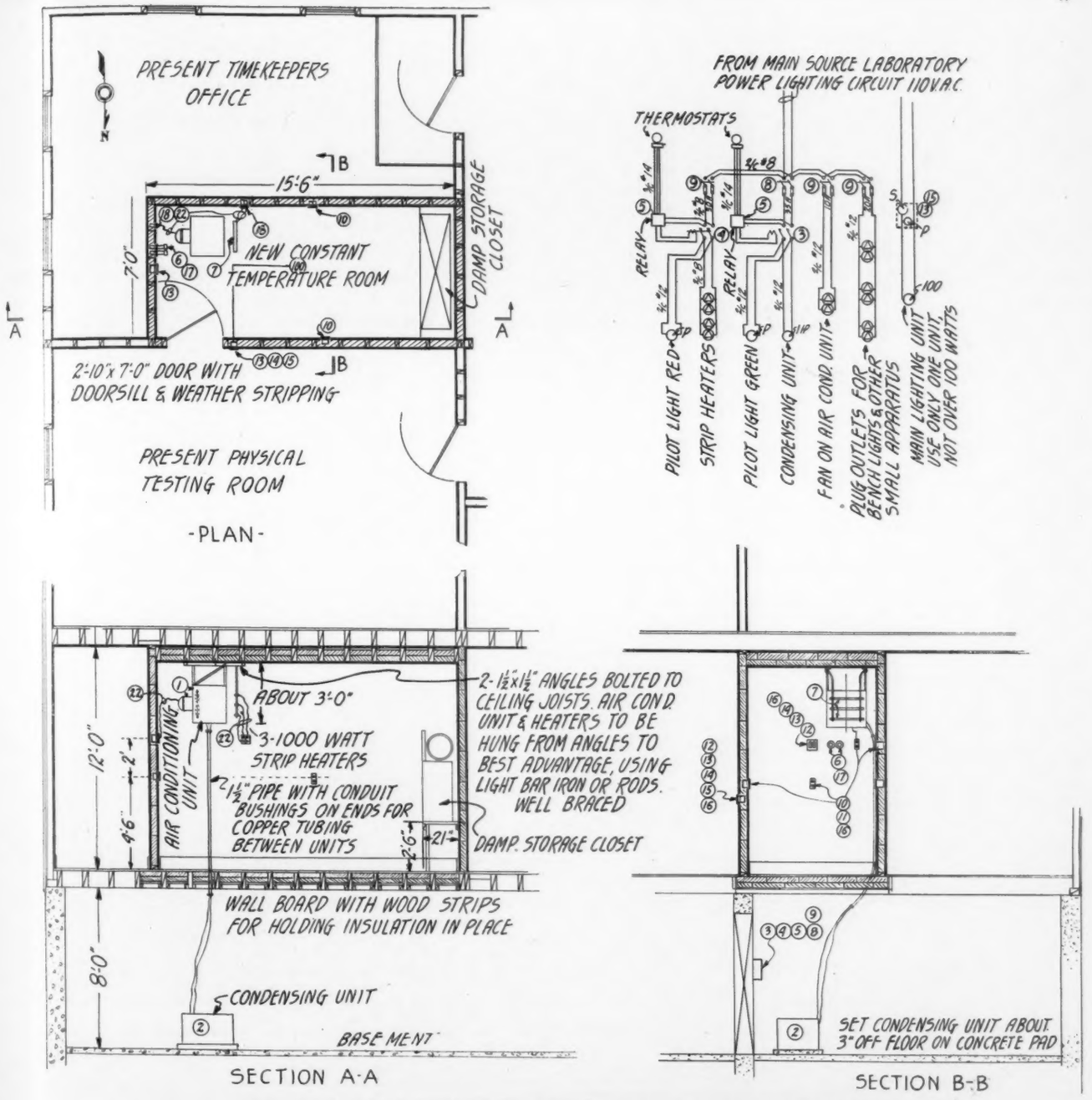
Lehigh Portland Cement Co. Designs Laboratory Now Standard at All the Company's Plants

THROUGH the courtesy of the officers of the Lehigh Portland Cement Co., ROCK PRODUCTS is permitted to reproduce the working plans of a new constant temperature room designed for installation at all of the company's plant laboratories. These have received such favorable comment from cement chemists throughout the country that these plans have been much sought after. The illustrations of this room (at the Oglesby, Ill., plant) were published in ROCK PRODUCTS, January 15, 1935, and are reproduced here. The particular set of drawings reproduced here was for the Mason City, Iowa, plant. The installations, of course, varied slightly to fit the special conditions. The specifications are given in detail for this particular installation because they illustrate how any present laboratory may be rebuilt to include a constant temperature room.

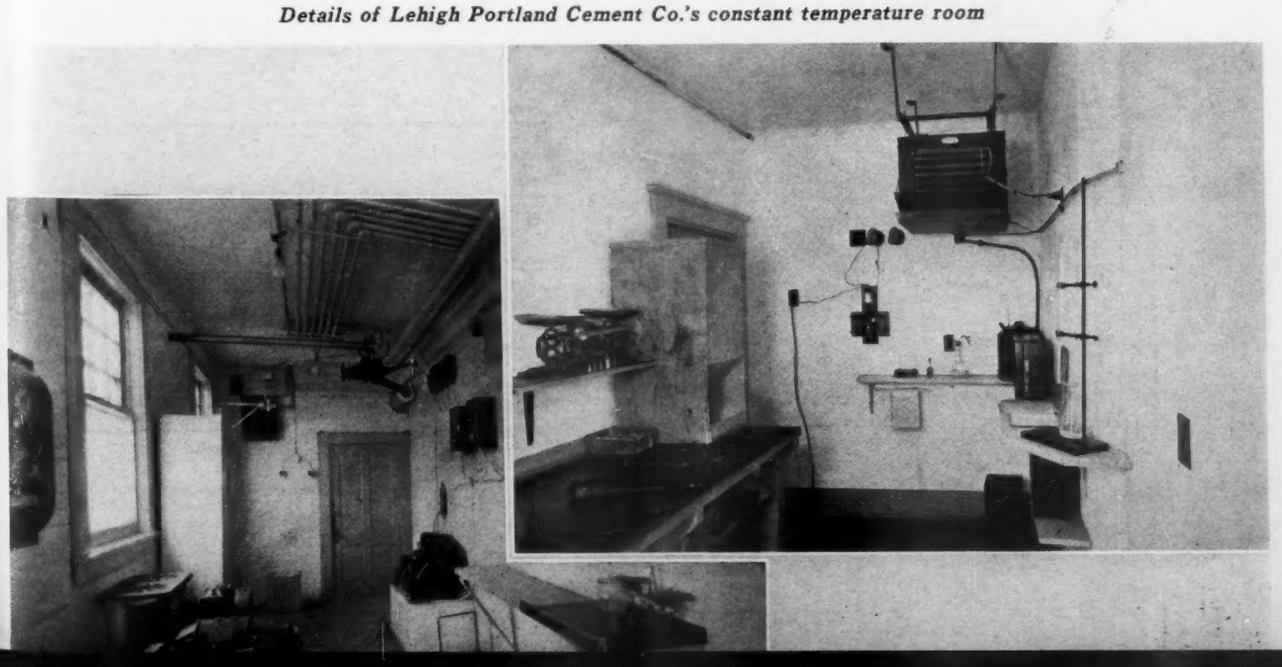
The wainscoting was removed from the north and west walls and replaced on the outside of the walls of the new room.

Present lath and plaster were removed on

Moist closet in the constant temperature room of new Lehigh Portland Cement Co. plant laboratories



Details of Lehigh Portland Cement Co.'s constant temperature room



north and west walls of new room, and insulation placed between the studding, and the walls relathed and replastered.

The new walls are 2x4-in. studding, 16 in. centers, with insulation between, and lath and plaster on both sides.

A new false ceiling in the room was made by using 2x8-in. joists placed against present plaster-insulation, lath and plaster placed as shown.

In the basement insulation was placed between present joists and held in place with wall board (in this installation the compressor unit is in the basement; at Oglesby it is in the adjoining room).

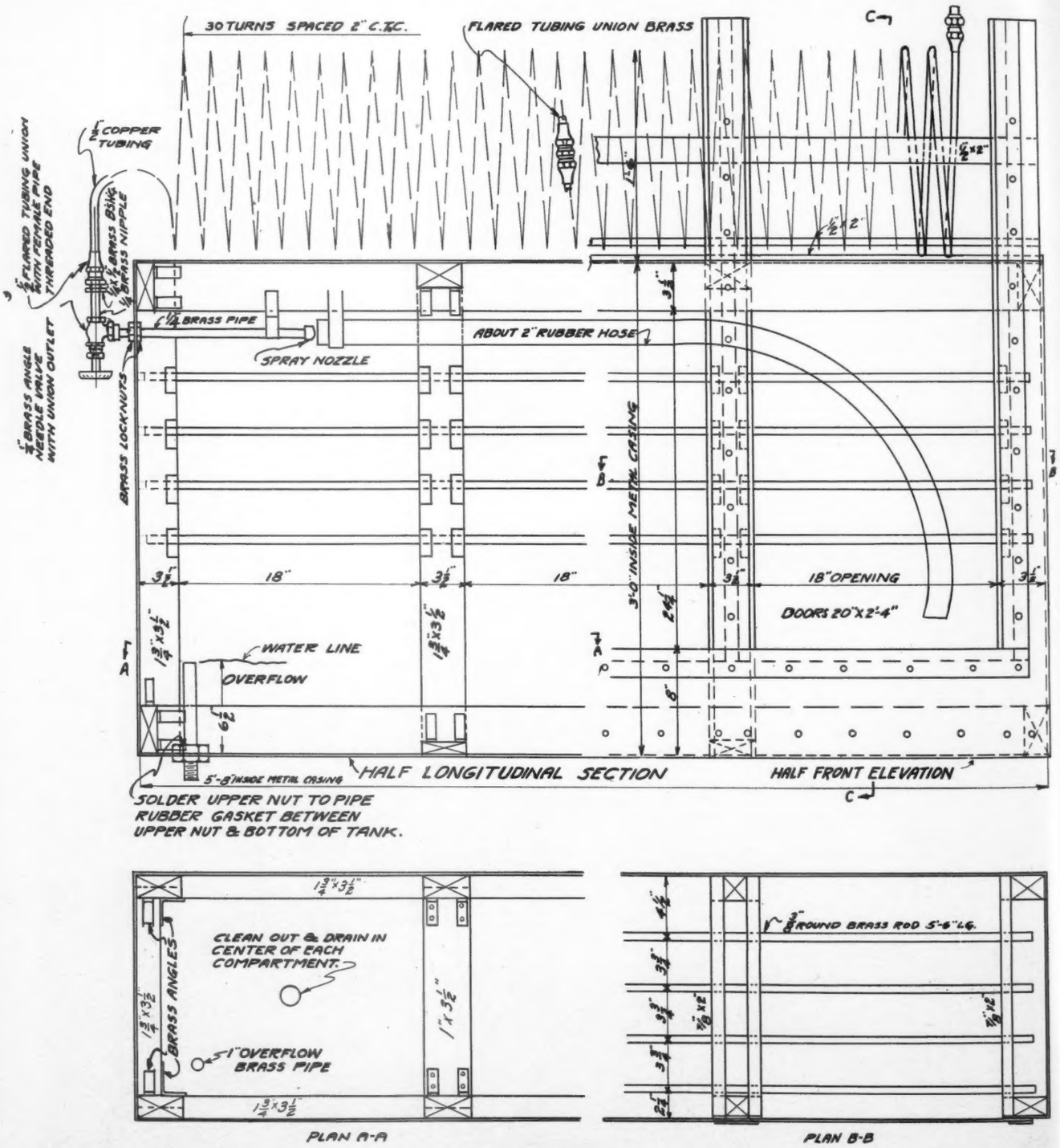
The insulation was carefully placed and well tucked in around all obstructions, such as bridging and bracing between joists and studs, so there were no openings.

The insulation used was rock wool made by the Standard Lime and Stone Co. in 15x18x3¼-in. blocks, which was conveniently forced between the studding spaced 16-in. centers. These blocks, of course, can be cut to fit the odd-sized spaces. One layer of insulation was placed in all walls and two layers in the ceiling and under the floor.

The work was all done by the company except that Frigidaire installation for air conditioning was made by the Frigidaire Corp. mechanics.

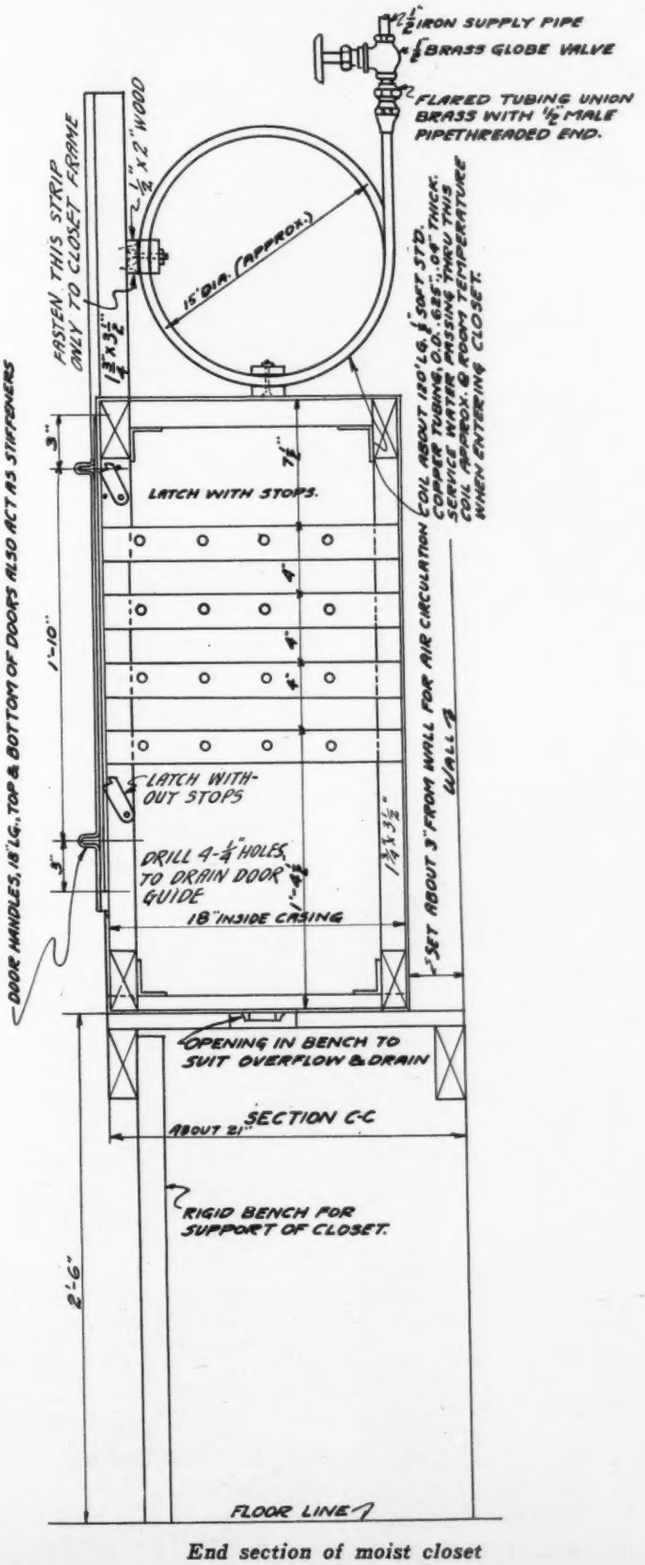
Materials Required

The equipment and materials required (the number of the item corresponding with that shown on plans) were as follows: (1) a Frig-



Above: Longitudinal section of moist storage closet of Lehigh Portland Cement Co. new constant temperature laboratory. Below: Plans of details

idaire air conditioner; (2) a Frigidaire condenser; (3) and (4) two magnetic switches, 2-pole, 110-v.; (5) two Type A relays 110/20 v.; (6) two thermostats; (7) three "Chromolox" strip heaters, 1000 watts, 110 v.; (8) Trumbull safety switch, 2 P.S.T., 60-amp., 250-v., fusible; (9) three Trumbull safety switches, 2 P.S.T., 30-amp., 250-v., fusible; (10) six Hubbell duplex receptacles, 3-wire polarized, flush; (11) six Bakelite plates for receptacles; (12) two Bakelite plates, 2-gang; (13) three Hubbell pilot light receptacles, with 2 c.p., 125-v. lamps; (14) three Hubbell bulls eyes (1 green, 1 red, 1 clear); (15) a Hubbell toggle switch; (16) ten switch boxes 2x3x2 in.; (17) six 4x2⅛ octagon General Electric outlet boxes; (18) four G.-E. plugs, polarized; (19) cable, 2/c, No. 8; (20) cable, 2/c, No. 12; (21) cable, 2/c, No. 14 (or 12) BX; (22) Tirex (or equal) 3/c No. 14 (or 12); (23) eight connectors for 2/c, No. 8, BX cable; (24) fifty connectors for 2/c No. 12, 3/c No. 14 cable.


½" IRON SUPPLY PIPE
¼ BRASS GLOBE VALVE
FLARED TUBING UNION BRASS WITH ½" MALE PIPETHREADED END.
FASTEN THIS STRIP ONLY TO CLOSET FRAME
2½" x 2" WOOD
15" DIA. (APPROX.)
1¼" x 3½"
COIL ABOUT 120" LG. ½" SOFT STD. COPPER TUBING, O.D. .625", .04" THICK. SERVICE WATER PASSING THRU THIS COIL APPROX. @ ROOM TEMPERATURE WHEN ENTERING CLOSET.
3"
7½"
LATCH WITH STOPS.
4"
4"
4"
1'-10"
LATCH WITH-OUT STOPS
3"
DRILL 4-¼" HOLES TO DRAIN DOOR GUIDE
1'-4½"
18" INSIDE CASING
1½" x 3½"
SET ABOUT 3" FROM WALL FOR AIR CIRCULATION
WALL
DOOR HANDLES, 18" LG., TOP & BOTTOM OF DOORS ALSO ACT AS STIFFENERS
OPENING IN BENCH TO SUIT OVERFLOW & DRAIN
ABOUT 21"
SECTION C-C
RIGID BENCH FOR SUPPORT OF CLOSET.
2'-6"
FLOOR LINE

End section of moist closet

Damp Storage Closet

The inside wood frame of the damp closet is made of dressed cypress, solidly constructed and fastened with brass angles and brass screws.

The outside casing is No. 22 U. S. standard gauge copper, tinned on one side (the tinned side on the inside of the closet), with joints lapped and soldered. The outside casing is fastened to the wooden frame with round-head brass screws spaced about 4 in. c. to c. Place solder around the screw heads.

Sliding doors and door guides are Monel metal No. 18 U. S. standard gauge. The door guides are fastened with round-head brass screws and soldered.

Much condensation occurs on the inside of the casing and the construction must be such that this condensation stays on the inside of the closet.

No temperature control is required for the moist closet as it is intended to be placed in the constant temperature room and is designed for ready transfer of heat into or out of the closet as the occasion demands. The proper relative humidty is maintained by directing the fog nozzle into a rubber tube through which air is injected and mixed with the fog, thus humidifying the air and at the same time providing the necessary circulation of atmosphere throughout the damp closet. The water from condensed vapor dripping from the lower end of the rubber tube provides fresh water for the water storage tank below.

Synthetic Pozzolana

MASTER BUILDERS CO., Cleveland, Ohio, has placed on the market "Pozzolith," a gelatinous colloid of high pozzolanic properties. The active pozzolanic ingredient is "Omicron," a synthetic pozzolana, which is claimed to react more rapidly and more completely with lime than any known pozzolanic material. Adding Pozzolith, as an admixture, to a concrete mix is claimed to permit reducing the water content by 10% or more and at the same time maintaining proper workability. By decreasing the water-cement ratio, the use of Pozzolith is claimed to reduce the shrinkage in concrete, increase its corrosive resistance to sodium sulphate solutions, increase resistance to freezing and thawing and increase compressive strength. It is recommended that Pozzolith be added to the concrete mix in the proportions of not less than 1½ pints per sack of cement, and in no event (for lean mixes) less than one gallon per cubic yard of concrete. The volume of water may be reduced by as much as the volume of Pozzolith added and apparently by as much more as tests indicate is practicable.

Hints and Helps for Superintendents

Simple Pulp Density Meter

IN WET GRINDING with ball and tube mill it is very desirable to know the percent of solids in the pulp, and especially is it desirable to keep this percentage constant.

It is an established fact that (*a*) the specific gravity of a given pulp rises with the solid content, and (*b*) the buoyancy of a given pulp increases with the pulp's specific gravity. So in this pulp density meter the buoyancy of the pulp is measured.

In the sketch, the cone *A* is made of light sheet iron and its diameter should be 10 to 18 in. Over the large end of the cone is stretched a piece of 12-oz. canvas and fastened securely to the cone. Heavy tar will be found useful to make the fit tight. When the canvas is in place it can be made impervious to water by an application of linseed oil or other waterproof filler.

The cone is now hung rigid in a small tank or cone which has an outlet at the bottom for the bulk of the pulp. An overflow lip is provided to take care of the excess pulp and in this manner a constant level of pulp is maintained in the tank. This tank is usually placed near the discharge of the tube mills or at the overflow of classifiers.

When the device is in place, connect cone to low angle water gage of the U type.

If the pulp has a high specific gravity, the buoyancy effect will press upwards the canvas membrane as shown by the dotted line *C*, and this pressure is indicated on the gage.

When the pulp is at the desired density, the reading can be noted on the gage and the operator can then regulate the ball mill feed, or the amount of water so that a uniform density is more easily secured.

This device was noted in a western plant.

Handy Screen for Re-screening

By Ross Wheelton,
Hamilton, Ont.

WHEN LOADING from the quarry stock pile the stone at the bottom of the pile at times contains considerable dust and fine stone, due to excessive handling.

Rescreening stock pile material

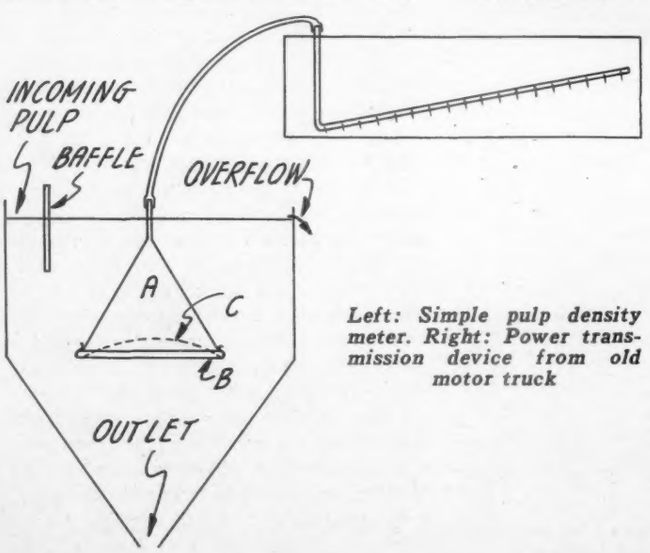
This stone for some purposes such as road surfacing, etc., is just as good as the properly sized product and consequently offers no problem. At our plant, however, we procured an order at a time when the stone was in such a condition, and the job called for properly sized material free from dust. We overcame the trouble by constructing a screen as shown in the accompanying view.

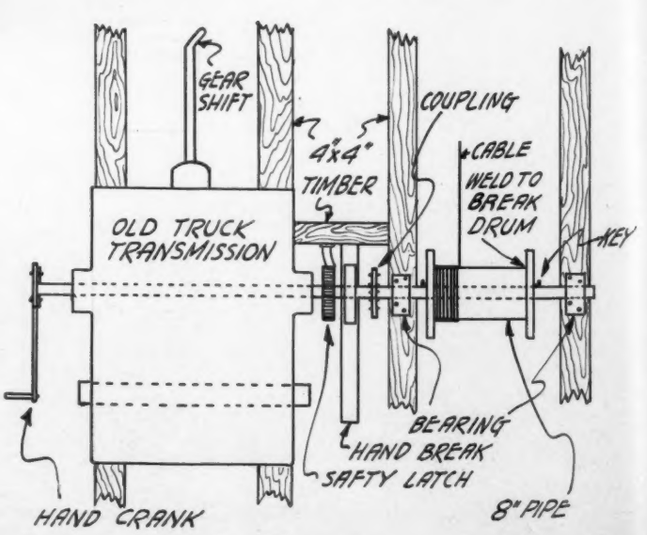
The lower end is of sufficient height to allow a truck to back under for loading, while the upper end is sheeted with lumber with a 2x6 in. to act as a baffle, placed crosswise, with a small space underneath, through which the material trickles slowly, when dropped on the sheeted portion above, with the clam bucket. The whole unit is built on two sills which act as skids and allow it to be moved from place to place as required.

Use for the Discarded Transmission

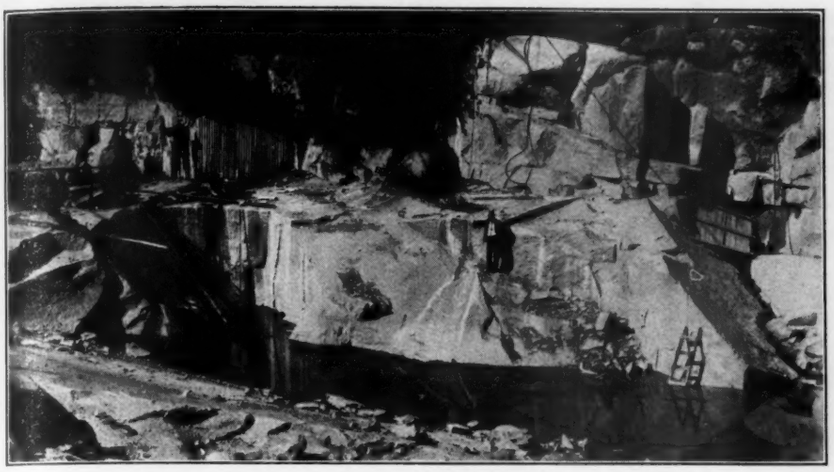
By Dare Paris.
Monrovia, Calif.

THE ACCOMPANYING SKETCH shows a hoist made from an old truck transmission and other parts taken from the junk pile around the plant. This type of hoist placed in the top of the plant will serve the purpose well in hauling up screens and repair parts. The hoist should be installed in such a place as to serve the different floors of the plant. It is made up of the following parts: use for gears old transmission from truck or car; hand crank is bolted on where clutch came off; safety latch is taken from old dump wagon; hand brake is made from the emergency break drum; hoisting drum





Left: Simple pulp density meter. Right: Power transmission device from old motor truck



In the foreground of picture is seen the water which seeped through the ground and rock fissures from the swamp near the quarry

consists of 8-in. pipe welded to brake drum taken from a car and keyed to the shaft. By using the gear shaft one has four speeds and can use according to the load coming up.

This makes a good practical light hoist that will lift around 1000 lb. and which can be built at very little expense.

Quarry Drainage Problem Solved*

AN unusual and novel use of explosives that illustrated their adaptability as well as their efficiency in performance occurred on the property of the Pike River Granite Co., Marinette, Wis.

The Mt. Rose quarry is about 660 ft. long and about 300 ft. wide at its broadest point. The quarry is hemmed in on one side by a dense swamp, and therein lay the peculiar problem, for water continually seeped into the pits from the swamp, interfering to an excessive degree with normal quarrying operations.

Superintendent Carl L. Redeman reports:

"The latter part of the summer seepage condition in our pits got a little the best of us, so that we had to put in two more pumps. Then I started to think of some way to control the seepage. Most of it seemed to come out of the upper seams in the face. I decided, if I could divert the course of a stream that drained a swamp adjacent to the quarry, at least some of the water coming into the pits might be shut off. I knew the swamp pretty well, a tangle of second-growth cedar, tamarac and dense underbrush. There really wasn't any sign of the stream except where the water flowed out at a culvert under a fire lane built through the swamp.

"When I first looked at that tangled mass of swamp growth where I thought a ditch ought to be made, I wasn't much encouraged. After I had the men cut the trees and brush, I found that about half the length of the ditch would have to be made through an old corduroy logging road.

"With three men making holes and loading about 300 lb. of du Pont ditching dynamite, we made, in half a day, a ditch about 200 yd. long, 6-ft. wide and about 3 ft. deep. We didn't try to make it any deeper, because at several places bed rock was not more than 3 ft. below the surface.

"About a week after the ditch was made, the seepage from the upper seams in the quarry face simply quit. We cut out the two extra pumps installed just before we made the ditch. And the whole ditching job cost us less than $100—dynamite, labor and everything."

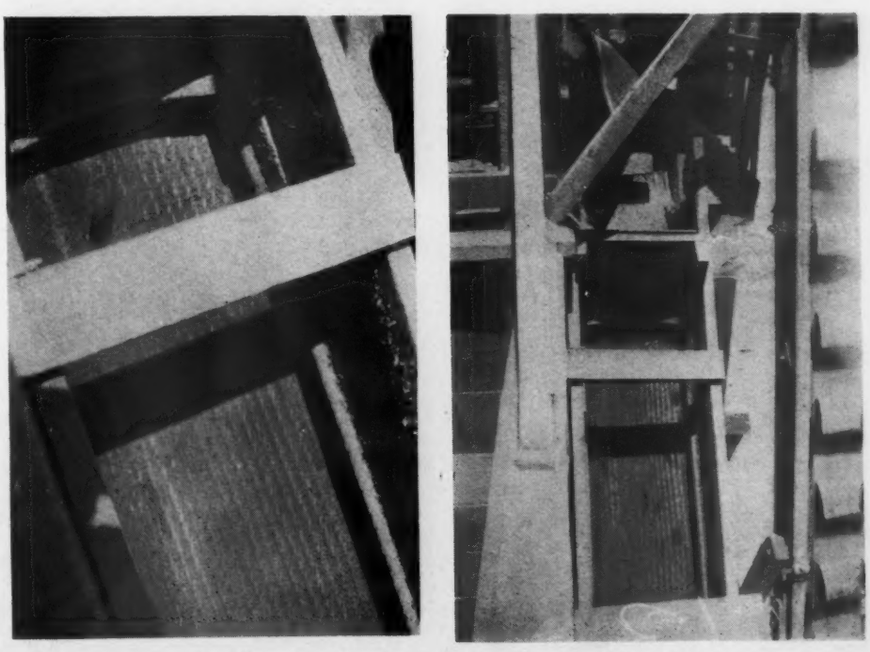
*Reprinted from the AG-EX News, E. I. du Pont de Nemours & Co.

The ditch made with dynamite to drain Mt. Rose Quarry

Steel Cable Used as Chute Lining

By Dare Paris,
Monrovia, Calif.

IN THE ACCOMPANYING ILLUSTRATION is shown a chute which is lined with 7/8-in. steel cable. This cable has already served its purpose on the dragline and has now been passed on to the plant for further use as a chute lining. It has proved to be better than plate steel and wears much longer. The cables are cut the length of the chute and nailed down with 16 penny nails driven about 12 in. apart. Cables should be cut with a torch and ends welded to prevent raveling. The chute shown is carrying oversize to a secondary crusher. It has been in use 12 months and shows very little wear. When cables become worn one or more can be replaced at a time without disturbing the others. A considerable amount of noise is eliminated with this type of chute.



Old steel wire rope makes lasting and economical chute lining

Rock Products News Briefs

Crushed Stone

New Haven Trap Rock Co. and **Connecticut Quarries Co.**, New Haven, Conn., were merged under the name of the New Haven Trap Rock Co. on April 1. The consolidation of the trap rock firms brings together the two largest quarry combinations in the state, if not in New England. The merger was made for the purpose of bringing about certain desirable economies in operation. The capitalization of the new corporation will be approximately $3,000,000. The quarries of the two firms are located in Cheshire, Granby, Meriden, Middlefield, New Britain, North Branford, Plainville, Rocky Hill and Trumbull. Distribution plants are located in Bridgeport, New London and Waterbury, Larchmont and Woodlawn, N. Y., and Worcester, Mass., and Providence, R. I. The following officers were elected: President, Clarence Blakeslee; vice-presidents, Harold L. Blakeslee, Albert L. Worthen, William E. Hilliard; secretary, George E. Hall; treasurer, Ray J. Reigeluth; general manager, Albert L. Worthen; assistant treasurer, Harold L. Blakeslee.

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Linwood Cement Co., Davenport, Ia., was sold at auction on April 8 to satisfy a judgment for $176,794 on mortgage notes held by the Liquidation Corp. and Henry W. Horst. The quarry and crushed stone plant of the company, near Buffalo, was sold to the mortgage holders for $150,000, 61% interest going to the Liquidation Corp. and 39% to Mr. Horst. The company has a year in which to redeem the property.

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Mellen Granite Co., Ashland, Wis., has applied to the state public service commission for permission to build a dam and hydro-electric power plant on the Potato river south of Gurney.

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Hodolga Lime Co., quarry, Friday Harbor, Wash., is in operation, producing 12 to 14 carloads of rock per day.

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Kelley Island Lime and Transport Co., Kelleys Island, Ohio, began quarry operations a month earlier than in 1934. Superintendent E. W. Fenwick is reported as stating that a busy season is anticipated.

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Great Lakes Shipments of limestone in 1934 amounted to 6,600,195 gross tons, the equal of 7,392,218 net tons, an increase of 649,429 gross tons, or 10.91% over the stone movement of 1933, according to the annual report of the Lake Carriers Association. The total also was an increase of almost 2,500,000 tons, or 69.66% over 1932 when the total movement fell to the low level of 1915, the year which characterized the beginning of limestone as a major commodity of the bulk freight commerce on the Great Lakes. Inasmuch as that portion of the limestone movement used as flux in iron making is to a large extent under the influence of iron ore, and since the iron ore shipments of 1934 represented a gain of only 2.89% over 1933, it may be assumed that the last season's sharp increase in limestone demands reflects increased requirements from commercial channels other than the iron and steel industries, the L. C. A. compilation reported.

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United Mineral Products Co., Omaha, Neb., has let a contract to L. A. Megrue and Arthur Miller of Scotia, Neb., to mine a chalky limestone near Scotia to be used in making paint filler and putty. The mineral company was organized recently with a capital of $125,000.

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Danville Quarry Co., Danville, Va., T. G. Laramore, president, has leased the city's quarry on the basis of $4000 per year or 6c per ton of stone quarried.

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Silica

Lightweight Aggregate Co., Napa, Calif., is producing a pumice aggregate for building construction in San Francisco. Richard Cicero is superintendent.

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Wedron Silica Co., Ottawa, Ill., lost a machine shop and power plant by fire on April 12. Loss was said to be about $30,000.

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Slate

Arvonia, Buckingham County, Va.: Slate quarries resumed operation April 1 after a shutdown of two years.

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Talc and Soapstone

Virginia-Alberene Corp., Schuyler, Va., will be reorganized by the bondholders under a plan approved by the local federal district court.

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Phosphate Rock

Columbia, Tenn.: One of the large fertilizer manufacturing mining companies is installing a new plant, said to be for the purpose of removing fluorine by heat process from either phosphate rock or, according to other reports, from phosphatic limestone. Such a process has been covered by patent assigned to one of the large mineral mixture companies and another has been the subject of publications issued during the past year by the staff of the U. S. Bureau of Soils. The purpose stated by the first is to remove fluorine to prevent injury to stock from using phosphate rock in feed mixtures, while that of the second is to remove fluorine in order to make the phosphoric acid citrate-soluble or as it is called, "available." Otherwise the processes as published are rather similar, but it is not announced yet which of these processes is to be used in the plant under construction, if either. Shipments of phosphate rock for the past two months have increased considerably over the rate for same period of any recent years, giving the appearance of considerable activity, but they have not yet even reached the rate of normal activity, and are still not up to two-thirds of active years. Spring movement of ground phosphate rock or lime phosphate for direct application is very much greater than it has been for several years, Illinois, Wisconsin and Kentucky being as usual the largest consuming territories. Shipments for high phosphorus pig iron manufacture are also showing greater activity, as well as other uses in connection with the greatly improved foundry trade. Normal movement continues to the electric furnace producers of phosphoric acid in Alabama, the blast furnace producers in Nashville, and the TVA Experimental plants at Muscle Shoals. Market is firm without undue activity and price trend is higher, while interest in phosphate properties, both developed and underdeveloped, continues active, but so far without recorded transfers showing any completed deals of significance.

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Sand and Gravel

Remington Stone and Gravel Co., Batavia, Ohio, has taken over the plant of the defunct Queen City Crushed Stone and Gravel Co. and has begun operation after more than a year's shutdown. The new company is controlled by the Radabaugh Co., contractors, Montgomery, Ohio; James Radabaugh is president of both companies. The real estate and plant of the Queen City company was purchased from the receivers for $14,324.67, subject to mortgage liens on some of the equipment.

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Rock Asphalt

Kentucky Rock Asphalt Co., Louisville, Ky., is reported to be employing upwards of 200 men at its quarries in Bowling Green, Ky. Orders are reported from New York State, North and South Carolina, Florida and Georgia.

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Ohio Asphaltic Limestone Co., Columbus, Ohio, is progressing in the construction of its new plant at New Vienna. S. F. Ferguson is in charge. Rail connection is being made with the Baltimore & Ohio R. R.

Rock Products News Briefs

Otho M. Graves Made Member of U. S. Bureau of Mines Advisory Board

TWENTY-NINE LEADERS of the mining and allied industries have accepted invitations from the Secretary of the Interior to act as an Advisory Board to the Bureau of Mines. The purpose of the board is to advise the director of the bureau, Dr. John W. Finch, on matters of bureau policy affecting relations with the industry. To represent non-metal mineral industries Otho M. Graves, president of the General Crushed Stone Co., Easton, Penn., was chosen. The members are designated to serve one year.

The board held its first meeting in Washington, D. C., April 15, with Dr. Finch and branch chiefs of the bureau. After a brief statement by Dr. Finch, outlining the organization and functions of the bureau, the board elected Howard N. Eavenson, chairman, and Julian D. Conover, secretary. The day was spent in consideration and discussion of matters of general bureau policy affecting relations with the mineral and allied industries and with the public.

The Board agreed that in its opinion the fact-finding work of the Government with respect to minerals and the mineral industry should be concentrated in the Bureau of Mines—the results to be available to the Congress, as heretofore, and to emergency governmental organizations; that as between the bureau and various trade organizations, statistical and economic studies should be made by the former with the help and coöperation of the latter; that the bureau should give especial attention to ways of preventing waste of natural gas during production of this valuable resource; that the Bureau of Mines should not be given statutory power to enforce its safety recommendations or to enter mines for inspection of safety practices under normal conditions or following disasters but should proceed with its policy of winning acceptance of its recommendations by methods of education as in the past. With respect to statistical and economic studies, however, the Board agreed that it would be desirable for the Bureau of Mines to have statutory power to compel operators in the mineral and allied industries to furnish statistical information, and under oath.

The chairman was authorized to appoint five committees to study various details of bureau work and prepare recommendations to be considered at a future meeting of the board. The members who attended the meeting, and the phases of the mining and allied industries they represent, are listed below:

Eastern bituminous coal producers—James P. Williams, Jr., Pittsburgh, Penn.; president, National Coal Association; vice president, the Koppers Coal Co.; Lewis E. Young, Pittsburgh, Penn.; vice president, Pittsburgh Coal Co.

Eastern anthracite producers—Louis C. Madeira III, New York, N. Y.; executive director, Anthracite Institute; Cadwallader Evans, Jr., Scranton, Penn.; general manager, the Hudson Coal Co.

Western coal producers—Eugene McAuliffe, Omaha, Neb.; president, Union Pacific Coal Co.; ex-president, American Mining Congress; D. S. Hanley, Seattle, Wash.; vice president, Pacific Coast Coal Co.; secretary-treasurer, Coal Producers Association of Washington; secretary, District VII Code Authority of Division V.

Mining employes—A. D. Lewis, Washington, D. C.; United Mine Workers of America; Irving W. Bucklin, representing William Green, Washington, D. C.; president, American Federation of Labor.

Copper industry—Cleveland E. Dodge, New York, N. Y.; vice-president, Phelps Dodge Corp.

Silver, lead and zinc industries—Frank M. Smith, Kellogg, Idaho; smelter director, Bunker Hill and Sullivan Mining and Concentrating Co.

Non-metal mineral industries—Otho M. Graves, Easton, Penn.; president, General Crushed Stone Co.; ex-president, National Crushed Stone Association; chairman, Code Authority, Crushed Stone, Sand and Gravel, and Slag Industries.

Mineral policy and government—Dr. C. K. Leith, Madison, Wis.; member, Science Advisory Board; member, Business Advisory and Planning Council for Department of Commerce; member, Planning Committee for Mineral Policy; Department of Geology, University of Wisconsin.

Mining and metallurgical engineer—Howard N. Eavenson, Pittsburgh, Penn.; past-president, American Institute of Mining and Metallurgical Engineers.

Liaison representative for mining industry in general—Howard I. Young, St. Louis, Mo.; president, American Mining Congress; president, American Zinc, Lead, and Smelting Co.; Julian D. Conover, Washington, D. C.; secretary, American Mining Congress.

Iron and steel industries—Forrest S. Rutherford, representing Thomas M. Girdler, Cleveland, Ohio; vice-president, American Iron and Steel Institute; chairman of the Board and president, Republic Steel Corp.

Petroleum industry—Amos L. Beaty, New York, N. Y.; vice-president and member executive committee, Phillips Petroleum Co.; director, American Petroleum Institute; Axtell J. Byles, New York, N. Y.; president, American Petroleum Institute; member, Planning and Coördination Committee under Petroleum Code.

Gas industry—Frank L. Chase, Dallas, Tex.; member advisory council, American Gas Association; second vice-president and operating manager, Lone Star Gas Co.; J. D. Creveling, New York, N. Y.; ex-president, Natural Gas Association of America; advisory council, American Gas Association.

Gold producers—Errol MacBoyle, San Francisco, Calif.; Gold Producers Association of America.

Explosives and research—J. Thompson Brown, Wilmington, Del.; vice-president, E. I. du Pont de Nemours and Co.

Health and safety appliances—George H. Deike, representing John T. Ryan, Pittsburgh, Penn.; vice-president and general sales manager, Mine Safety Appliances Co.; E. W. Bullard, San Francisco, Calif.; president, E. D. Bullard Co.

Illinois Supreme Court Decision Has Important Bearing on Silicosis

IN FIVE OPINIONS handed down April 17, the Illinois state supreme court ruled Section 1 of the occupational disease act was unconstitutional on the grounds that it violates the "due process" clause of the state and federal constitutions.

The statutory provision held unconstitutional provided "that every employer of labor in carrying on work which may produce any illness of disease peculiar to the work or process carried on, or which subject employes to the menace of illness or disease peculiar to such work to which ordinary employes are not exposed in other lines of employment, shall, to protect the employes, adopt and provide reasonable and approved devices or methods to prevent such industrial or occupational diseases as are incidental to such work."

The legislature, the court held, had failed to set up any standards by which judgment of the administrative department could be measured and as a result the department could decide arbitrarily what devices or methods are approved reasonably necessary, reasonable or adequate.

By attempting to vest legislative powers in the department, the court held, the statute violated Article 3 of the state constitution and for the same reason Sections 12 and 13 of the health, comfort and safety act were held unconstitutional by the court. The court reversed the Cook County circuit court, which had awarded $20,000 to Teleforo Navarro, who claimed he contracted pneumonoconiosis, a lung disease, through breathing fumes while employed by the Illinois Steel Co., at Ottawa. It sustained the Cook County superior court, which had dismissed a suit of James Park against the Libby-Owens-Ford Glass Co.

Bituminous Concrete Plants

Jamestown Macadam Co., Jamestown, N. Y., is constructing a $50,000 plant for crushing, mixing and handling crushed stone mixed with asphalt binder. The company has also leased dock property nearby to provide for Lakes shipments.

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Interstate Amiesite Co., Inc., Wilmington, Del., plans a new plant at Dunbar, near Connellsville, Penn., to cost about $75,000. The raw materials, stone and sand, will be provided by the New Castle Lime and Stone Co. and the Dunbar Corp. It is expected that the annual output will reach 50,000 to 60,000 tons. R. G. Kitchell, of South Connellsville, will be the superintendent. The buildings will be of sheet metal material with concrete bases for all machinery.

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Suburban Construction Co., Winfield, Penn., completed a new Amiesite plant on April 15, adjacent to the Smith Brothers quarry and crushing plant. In 1934 the state highway department of Pennsylvania is said to have purchased about 1,000,000 tons of Amiesite—a cold-mixed asphaltic concrete material. William P. Estelle is superintendent of the Winfield plant.

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Miscellaneous Rock Products

United States Vermiculite Co., Youngstown, Ohio, has leased mining rights of four vermiculite deposits in Macon County about 75 miles west of Asheville, N. C., and will begin shipments soon to Youngstown.

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	4-19-35	3	5	
Allentown P. C., pfd.[47]	4-19-35	4	6	
Alpha P. C., com.	4-20-35	17 actual sale		.25 April 25
Amalgamated Phos. 6's, 1936[47]	4-19-35	100	102	
American Aggregates, com.[48]	4-15-35	¾	1¾	
American Aggregates, pfd.[48]	4-15-35	3	6	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	4-15-35	35	40	
American Aggregates, 6's, 1943, old bonds[48]	4-15-35	35	40	
American L. and S., 1st 7's[48]	4-15-35	100½	....	
Arundel Corp., com.[48]	4-15-35	16	....	.25 (qu.) April 1
Ashgrove L. & P. C., com.[49]	4-16-35	10¾	....	
Ashgrove L. & P. C., pfd.[49]	4-16-35	95¼	....	
Bessemer L. and C., Class A[47]	4-19-35	3	4	
Bessemer L. and C., 1st 6½'s, 1947[48]	4-15-35	30 F		
Bessemer L. and C., cert. of dep., 1947[46]	4-15-35	30	35	
Bloomington Limestone, 6's[47]	4-19-35	8	11	
Boston S. and G., com.[37]	4-15-35	1½	3	
Boston S. and G., 7% pfd.[37]	4-15-35	5⅛	8	
Boston S. and G., 7's, 1939[37]	4-15-35	67½	....	
Calaveras Cement, com.[40]	4-12-35	¾	1¼	
Calaveras Cement, 7% pfd.[40]	4-12-35	32	35	
California Art Tile, A[9]	4-13-35	1.1	2	
California Art Tile, B[9]	4-13-35	....	1	
Canada Cement, com.	4-15-35	7 actual sale		
Canada Cement, pfd.	4-15-35	56 actual sale		
Canada Cement, 5½'s, 1947	4-20-35	101	....	
Canada Crushed Stone, bonds[42]	4-23-35	92	96	
Canada Crushed Stone, com.[42]	4-23-35	no market		
Certainteed Products, com.	4-18-35	4½ actual sale		
Certainteed Products, pfd.	4-18-35	25	27	
Certainteed Products, 5½'s, 1948	4-20-35	73¾ actual sale		
Consol. Cement, 1st 6½'s 1941[47]	4-19-35	29	31	
Consol. Cement, pfd.[47]	4-19-35	2	3	
Consol. Oka S. and G. (Can.), 6½'s[47]	4-24-35	18	23	
Consol. S. and G., com.[42]	4-23-35	no market		
Consol. S. and G., pfd.[42]	4-23-35	25	30	
Consol. Rock Products, com.[47]	4-19-35	1	2	
Consol. Rock Products, pfd.[47]	4-19-35	2	3	
Consol. Rock Products, units[47]	4-19-35	3	5	
Construction Mat., com.[47]	4-19-35	1	2	
Construction Mat., pfd.[47]	4-19-35	2	3	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	4-19-35	20	25	
Coosa P. C., 1st 6's[47]	4-19-35	20	25	
Coplay Cement Mfg., pfd.[47]	4-19-35	10	15	
Coplay Cement Mfg., 6's, 1941[47]	4-19-35	70	75	
Cumberland P. C., 7's, 1937[47]	4-19-35	80	85	
Dewey P. C., com.[47]	4-19-35	30	35	
Dolese and Shepard	4-20-35	9½	11½	
Dufferin Pav. and Cr. Stone, com.[42]	4-23-35	1	2	
Dufferin Pav. and Cr. Stone, pfd.[42]	4-23-35	25	30	
Federal P. C., 6½'s, 1941[47]	4-19-35	20	25	
Fla. Port. Cement, 6½'s, 1937[46]	4-15-35	93	95	
Fla. Port. Cement, units[47]	4-19-35	17½	19	
Giant P. C., com.[47]	4-19-35	2	4	
Giant P. C., pfd.[47]	4-19-35	14	17	
Gyp. Lime & Alabastine, Ltd.	4-15-35	6¼ actual sale		
Gyp. Lime & Alabastine, 5½'s, 1948[47]	4-19-35	85	90	
Hawkeye P. C., cap.[49]	4-16-35	29½	35	
Hercules Cement, com.[49]	4-16-35	18	....	
Hercules Cement, 7% pfd.[49]	4-16-35	70	....	
Hermitage Cement, com.[47]	4-19-35	12	15	
Hermitage Cement, pfd.[47]	4-19-35	55	65	
Ideal Cement, 5's, 1943[47]	4-19-35	100	102	
Ideal Cement, com.[47]	4-19-35	34	36	.50 (qu. & ex.) Apr. 1
Indiana Limestone 6's[47]	4-19-35	8	11	
International Cement bonds, 5's, 1948	4-20-35	100¾ actual sale		
International Cement, com.	4-20-35	27¼ actual sale		
Kelley Island L. and T.	4-20-35	11	12	.15 (qu.) Apr. 1
Ky. Cons. Stone, 6½'s, 1938[47]	4-19-35	10	15	
Ky. Cons. Stone, com.[47]	4-19-35	1	2	
Ky. Cons. Stone, pfd.[47]	4-19-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[46]	4-15-35	13	....	
Ky. Rock Asphalt, com.[46]	4-15-35	⅛	½	
Ky. Rock Asphalt, pfd.[46]	4-15-35	2½	4	
Ky. Rock Asphalt, 6½'s, 1935[47]	4-19-35	25	30	
Lawrence P. C.	4-18-35	13	14	
Lawrence P. C., 5½'s, 1942[47]	4-19-35	82	85	
Lehigh P. C., com.	4-18-35	13½	13½	
Lehigh P. C., 7% pfd.	4-18-35	98⅝	100	.87½ Apr. 1
Louisville Cement[47]	4-19-35	75	85	
Lyman-Richey 1st 6's, 1935[47]	4-19-35	25	30	
Marbelite Corp., com. (cement pts.)[40]	4-12-35	⅜	½	
Marbelite Corp., pfd.[40]	4-12-35	4	....	
Marblehead Lime, 6's, 1939[14]	4-16-35	40	....	
Marquette Cement, com.[47]	4-19-35	20	22	
Marquette Cement, pfd.[47]	4-19-35	88	91	1.50 (qu.) Apr. 1
Marquette Cement Mfg. 1st 5's, 1936[47]	4-19-35	99	101	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Marquette Cement Mfg. 1st 6's, 1935[46]	4-15-35	100½	....	
Material Service Corp.[47]	4-19-35	1	3	
McCrady-Rodgers, com.[47]	4-19-35	5	7	
McCrady-Rodgers, 7% pfd.[47]	4-19-35	25	30	
Medusa P. C., com.[47]	4-19-35	12	15	
Medusa P. C., pfd.[47]	4-19-35	40	45	
Michigan L. and C., com.[47]	4-19-35	60	65	
Missouri P. C.	4-20-35	6¾ actual sale		
Monarch Cement, com.[47]	4-19-35	70	80	
Monolith P. C., com.[9]	4-13-35	2½	3½	
Monolith P. C., 8% pfd.[9]	4-13-35	6¼	7¼	
Monolith P. C., units[9]	4-13-35	15	18	
Monolith P. C., 1st mtg. 6's[9]	4-13-35	99	101	
Monolith Portland, Midwest[9]	4-13-35	1	1½	
National Cement (Can.) 1st 7's,[47]	4-24-35	100	102	
National Gypsum A, com.[47]	4-19-35	8	10	
National Gypsum, pfd.[47]	4-19-35	88	91	1.75 Apr. 1
National Gypsum, 6's[47]	4-19-35	101	103	
National L. and S., 6½'s, 1941[47]	4-19-35	94	97	
Nazareth Cement, com.[47]	4-19-35	4	6	
Nazareth Cement, pfd.[47]	4-19-35	35	40	
Newaygo P. C., 7% cum. pfd.[49]	4-16-35	25	....	
Newaygo P. C., 1st 6½'s, 1938[46]	4-24-35	87	....	
New England Lime 6's, 1935[14]	4-16-35	8	10	
N. Y. Trap Rock, 1st 6's, 1946.	4-18-35	67⅛	70	
N. Y. Trap Rock, 7% pfd.[46]	4-15-35	50 nominal		
North Amer. Cement, 1st 6½'s, 1953[47]	4-19-35	20	22	
North Amer. Cement, 6½'s, 1943[47]	4-19-25	72	75	
North Amer. Cement, 6½'s, 1940[47]	4-19-35	48	51	
North Amer. Cement, com.[47]	4-19-35	1	2	
North Amer. Cement, 7% pfd.[47]	4-19-35	1	2	
North Shore Mat. 1st 6's[47]	4-19-35	30	35	
Northwest'n Port. Cem., units[47]	4-24-35	25	28	
Northwestern States P. C.[47]	4-19-35	25	28	.50 Apr. 1
Ohio River S. and G., com.	4-22-35	....	3	
Ohio River S. and G., 1st pfd.	4-22-35	50	....	
Ohio River S. and G., 2nd pfd.	4-22-35	5	10	
Ohio River S. and G., 6's[46]	4-15-35	10	....	
Oregon P. C., com.[47]	4-19-35	2	4	
Oregon P. C., pfd.[47]	4-19-35	65	68	
Pacific Coast Agg., new com.[40]	4-12-35	1	1⅛	
Pacific Coast Cement 6's, 1937[40]	4-12-35	101	....	
Pacific P. C., com.[40]	4-12-35	2½	3½	
Pacific P. C., pfd.[40]	4-12-35	35	37	
Peerless Cement, com.[47]	4-19-35	½	1	
Peerless Cement, pfd.[47]	4-19-35	3	4	
Penn.-Dixie Cement, com.	4-20-35	4¼ actual sale		
Penn.-Dixie Cement, pfd.	4-20-35	22 actual sale		
Penn.-Dixie Cement, 6's A, 1941	4-18-35	78	83	
Penn. Glass Sand Corp., pfd.[47]	4-19-35	85	90	3.50 (qu. & ar.) Apr. 1
Penn. Glass Sand Corp., 6's[47]	4-19-35	72	74	
Petoskey P. C., 6's, 1941[48]	4-15-35	55	....	
Petoskey P. C., 6's, 1935-38[48]	4-15-35	75	....	
Petoskey P. C., com.[48]	4-15-35	2½	3½	
Republic P. C., 6's, 1943[47]	4-19-35	85	88	
Riverside Cement, A[9]	4-13-35	7½	9	
Riverside Cement, B[9]	4-13-35	¾	1	
Riverside Cement, pfd.[9]	4-13-35	90	95	1.50 (qu.) May 1
Rockland and Rockport Lime, 1st pfd.[47]	4-19-35	2	3	
Sandusky Cement, 6½'s[47]	4-24-35	80	85	
Santa Cruz P. C., com.[9]	4-13-35	58	61	.50 (qu.) Apr. 1
Schumacher Wallboard, com.[9]	4-13-35	....	2	
Schumacher Wallboard, pfd.[9]	4-13-35	1½	3	
Signal Mt. P. C., units[47]	4-24-35	22	25	
Southwestern P. C., units[40]	4-12-35	185	....	
Spokane P. C., units[40]	4-16-35	8	....	
Standard Paving & Mat. (Can.), com.[42]	4-23-35	¾	1	
Standard Paving & Mat., pfd.[42]	4-23-35	10	17	
Superior P. C., A[40]	4-12-35	33	35	.27½ (accum.) May 1[9]
Superior P. C., B[40]	4-12-35	7	8½	
Trinity P. C., units[47]	4-24-35	10	15	
U. S. Gypsum, com.	4-20-35	47½ actual sale		.25 Apr. 1
U. S. Gypsum, pfd.	4-20-35	148½ actual sale		1.75 Apr. 1
Volunteer P. C., 1st 7's, 1942[49]	4-16-35	65	....	
Volunteer P. C., com.[49]	4-16-35	1½	3	
Vulcanite P. C., cap.[49]	4-16-35	1½	5	
Vulcanite 7½'s, 1943[49]	4-16-35	44	....	
Wabash P. C.[47]	4-19-35	6	8	
Warner Co., ww. 1st 6's[47]	4-19-35	33	35	
Warner Co., com.[47]	4-19-25	1	2	
Warner Co., pfd.[47]	4-19-35	9	11	
Whitehall Cement Mfg., com.[47]	4-19-35	25	30	
Whitehall Cement Mfg., pfd.[47]	4-19-35	55	60	
Wisconsin L. & C., 1st 6's, 1940[47]	4-19-35	40	50	
Wolverine P. C., com.[47]	4-19-35	1½	3	
Yosemite P. C., A. com.[40]	4-12-35	1¼	1½	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plots and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

F—Flat. [9] Covers Sept. 1, 1934, payment, leaving $2.20 in arrears.

Recent Dividends Announced

Marquette Cement Mfg. Co., 6% pfd. (quar.)	$1.50	April 1, 1935
Riverside Cement Co., cum. pfd (quar.)	1.50	May 1, 1935
Superior Portland Cement, A (accum.)	.27½	May 1, 1935
Northwestern States P. C. Co.	.50	April 1, 1935

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Pennsylvania Dixie Cement Corp., New York City, reports for the year ended March 31, 1935, a profit of $1,174,274 before depreciation, depletion and interest, comparing with profit of $396,528 for the 12 months ended March 31, 1934. After provision for depreciation, depletion and interest, there was a net loss of $743,266 against net loss of $1,549,736 in the preceding 12 months.

Consolidated balance sheet as of March 31, last, shows current assets of $3,949,853 and current liabilities of $222,253.

Consolidated income account for 12 months ended March 31, 1935, compares as follows:

	1935	1934
Operating profit	$1,174,274	$ 396,528
Depreciation and depletion	1,358,750	1,370,951
Interest	558,790	575,313
Net loss	$ 743,266	$1,549,736

For the calendar years 1934 and 1933 the company reported a consolidated income account as follows:

	1934	1933
Net sales	$4,642,338	$2,736,133
Cost of sales	1,958,279	
Expenses	1,041,947	
Maintenance and repairs	276,900	2,456,910
Taxes	138,894	
Provision for uncollectibles	31,173	
Depreciation and depletion	1,355,578	1,376,879
Operating loss	160,433	1,097,656
Other income	37,342	*
Non-consolidated subsidiary loss	4,853	.....
Total loss	127,944	1,097,656
Interest	563,976	577,083
Net loss	691,920	1,674,739

*Deducted from expenses above.

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Calaveras Cement Co., San Francisco, Calif., reports an income statement for the year ended December 31:

	1934	1933
Operating profit	$291,757	$219,411
Other income	11,343	15,694
Total income	$303,100	$235,105
Selling administration and general expenses	178,687	157,411
Depreciation and depletion	120,805	109,655
Experimental work	12,196	.....
Net loss	$ 8,589	$ 31,961

The balance sheet, as of December 31, 1934, showed current assets of $703,029 and current liabilities of $51,203; working capital $651,826.

Profit from operations, before depreciation and other charges, was $124,413, an increase of $46,719 over the $77,694 net operating profit shown in 1933. Selling, administrative and general expenses were higher by $21,276 in 1934 than in the preceding year.

Commenting on the year's operations, William Wallace Mein, president, in his annual report says: "Low manufacturing costs are of fundamental importance in meeting the intensive competition prevailing in the cement industry. During the past year, there was expended for plant improvements $18,712, and to further reduce production costs, additional plant expenditures are now under way and further imrpovements are contemplated. Your management feels that the pursuance of this policy which in the light of past experience has proven desirable, together with a sound financial policy, will enable your company to maintain and improve its competitive position in the cement industry. It is regrettable that the unsettled prices for cement which prevailed during 1934 made it impossible to achieve a fair profit which would have enabled the company to resume dividend payments on the preferred stock. Thus far in 1935 the price situation has been much more stable, and with a continuance of this condition and an improvement in business generally there is every reason for encouragement."

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Coplay Cement Manufacturing Co., Coplay, Penn. reports a consolidated net income, after depreciation, depletion, interest and other charges, for the year ended December 31: A profit of $18,592 in 1934 against a deficit of $108,279 in 1933. Current assets on December 31, 1934, were $488,695 and current liabilities $43,394. During 1934 the company paid a dividend of $1.50 on preferred stock in arrears.

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Alpha Portland Cement Co., Easton, Penn., reports for the 12 months ended March 31, 1935, show consolidated net loss of $160,650 after taxes, depreciation, depletion, minority interest, etc., comparing with net loss of $524,507 for the 12 months ended March 31, 1934. Current assets as of March 31, 1935, including $3,844,241 cash, U. S. Treasury bonds and marketable securities amounted to $5,341,890 and current liabilities were $539,465. On March 31, 1934, cash U. S. bonds and other marketable securities totaled $5,597,340, current assets amounted to $7,631,479 and current liabilities were $344,993.

At March 31, 1935, machinery spare parts aggregating $411,686 heretofore included as inventory, have been transferred to the property accounts.

Consolidated income account for 12 months ended March 31, 1935, compares as follows:

	1935	1934	1933
Net sales	$4,815,998	$4,186,566	$3,873,012
Operating expenses	3,715,411	3,422,322	4,208,141
Depreciation and depletion	1,454,227	1,421,100	1,409,046
Operating loss	$ 353,640	$ 656,856	$1,744,175
Other income (net)	184,971	121,179	89,219
Loss	$ 168,669	$ 535,677	$1,654,956
Minority interest	*8,019	*11,170	*12,789
Net loss	$ 160,650	$ 524,507	$1,642,167
Preferred dividends	128,334	140,000	140,000
Common dividends	322,300	.....	.....
Deficit	$ 611,284	$ 664,507	$1,782,167

*Credit.

As of January 1, 1934, the companies adopted the policy of treating profits, losses, and adjustments applicable to marketable securities as income items instead of surplus items.

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North American Cement Corp., New York City, reports for the 12 months ended March 31, 1935, a net loss of $160,962, after taxes, depreciation, depletion, interest, amortization, etc., comparing with a net loss of $734,070 for the 12 months ended March 31, 1934. For the calendar year ended December 31, 1934, the company reported a net loss of $138,840. Current assets as of December 31, 1934, including $658,450 cash, amounted to $1,411,045 and current liabilities, including $148,000 6% first mortgage bonds due August 20, 1935, were $294,650 compared with cash of $322,088, current assets of $944,074 and current liabilities of $176,629 at end of preceding year. Inventories were $631,324 against $480,912 on December 31, 1933.

Income account for year 1934 compares as follows:

	1934	1933
Net sales	$2,627,221	$1,524,586
Costs and expenses	1,830,519	1,303,405
Balance	$ 796,702	$ 221,181
Other income	10,155	6,658
Total income	$ 806,857	$ 227,839
Depreciation and depletion	754,919	777,173
Interest, etc., net	180,778	173,006
Profit or loss on cash in closed banks	10,000	20,000
Net loss	$ 138,840	$ 742,340

In his annual report to stockholders President John J. Porter said the cost trend in 1934 was upward both for labor and materials; that the plants had been well maintained and are in good operating condition, but that need for a larger program of capital expenditures is becoming more urgent. He said: "We cannot continue indefinitely to use our depreciation reserves for the strengthening of our financial position." He explained the uncertainties of 1935 prospects because of the diversion of state highway funds and the letting in of Belgian cement. A reading of this report should give any intelligent newspaper editor ample material for discussing stagnation of the capital goods (machinery) industries.

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Dolese & Shepard (crushed stone), Chicago, Ill., reports a net loss for the calendar year 1934 of $53,620, after depreciation of $24,143, compared with a loss of $51,325 in 1933. The market value of the company's investment securities increased $28,300 in 1934. Current assets as of December 31, 1934, were $199,965 and current liabilities $100,057. Total assets were $1,216,656. Some $17,000 was spent on replacements and repairs. Inventory decreased 54,126 cu. yd.

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Hawkeye Portland Cement Co., Des Moines, Ia., reports a balance sheet for the year ended December 31, 1934, showing current assets of $642,316 and current liabilities of $100,295; compared with $622,627 and $63,225, respectively, for the previous calendar year. Total assets and liabilities were written down $44,526 during 1934.

Revised Code for Lime Industry

After Nearly a Year in the NRA Mill the New Code Seems to Be Real Improvement Over the First—At Least It Is in More Precise Language

THE AMENDED CODE of Fair Competition for the Lime Industry, which was the subject of much debate at the industry's convention in Washington, D. C., May 22-24, a year ago, and has been the subject of many conferences with NRA since, has at last emerged and on April 1 was approved by W. A. Harriman, administrative officer of NRA, and it became effective April 11. Certain important parts of the amended code relating to merchandizing methods, as noted hereafter, are stayed for a period of 90 days "for further study" by NRA, and presumably to see what Congress will do in dealing with all code provisions of this nature.

If the code is ultimately approved in its entirety with these provisions, it would seem to provide a very fair basis for industry self-government with ample protection to the public, or consumers of lime. Present approval is qualified with the provision that the Research and Planning Division of NRA and the Trade Relations Committee of the National Lime Association "shall make a further study and report fully to NRA on or before June 15, 1935, as to the effect, if any, of the multiple basing point provisions on prices to consumers, and any effects of the system in either permitting or encouraging price fixing or providing unfair competitive advantages for producers or disadvantages for consumers." This qualification is doubtless provided to give NRA a chance to hedge if anything develops from the recent reports to the President on basing point prices (Rock Products, April, 1935, p. 57).

Definitions

Several important changes in definitions were made to clarify and broaden the scope of the code. The following are most important as they have to do with the merchandizing methods, which (by the staying of certain provisions) are still open to debate, and would be generally applicable to all the rock products industry if this code is to serve as a model for their later revisions:

[Article II] Section 9. The term "low rate area" shall mean that area surrounding a rail basing point established by the District Control Committee as provided for in Article VIII, Section 2, Subsection (*b*), which shall include all destinations to which such basing point has a minimum carload rail freight rate for Industry Products manufactured in such low rate area, lower than or equal to the minimum carload rail freight rate from another rail basing point on like Industry Products of similar grade and quality.

Section 10. The term "dealer" includes, but without limitation, any individual, partnership, association, corporation or other form of enterprise, either as an employer or on his or its own behalf, regularly engaged in the business, in whole or in part, of purchasing Industry Products at wholesale for resale and/or distribution as a retailer. For the purposes of this code, the term "dealer" includes, but without limitation, "Building Supply Dealers" and "Agricultural Dealers," who are described as follows:

(*a*) A "Building Supply Dealer" is defined as any individual, partnership, association, corporation, or other form of enterprise engaged either as an employer or on his or its own behalf engaged in the Builders Supply Trade, buying at wholesale for resale at retail.

(*b*) An "Agricultural Dealer" is defined as a dealer in agricultural supplies who purchases agricultural lime in wholesale quantities for resale at retail, and who regularly solicits the business of and renders a dealer service to agricultural consumers in his locality.

Section 11. A "jobber" is any individual partnership, association, corporation, or other form of enterprise who buys Industry Products and resells at wholesale for his own account.

Section 12. An "agent" is any individual, partnership, association, corporation, or other form of enterprise regularly engaged in selling Industry Products on a commission basis for a member or members of industry to retailers and/or consumers with whom he is not connected or related in business. For the purpose of this code, the term "agent" shall mean jobbers, distributors or brokers, but provided further, that "jobber" as herein referred to is in contradistinction to the term "jobber" as used in Section 11.

Labor

The labor sections have been rewritten and made clearer, but not changed essentially: 40 hours in not more than six days is still the maximum week, but in peak periods longer periods may be worked, for 1½ times regular pay for overtime, provided the employe does not average more than 40 hours a week over a three months' period (the old limit was six months). Watchmen, not provided for in the old code, are permitted a 56-hour week (the industry asked for 60). Employes are not permitted to work for two employers, so that their combined time exceeds the maximum. The minimum wages (30c in the South, 37½c in the North) remain as they were. Wages above the minimum must be adjusted (if not already done) within 30 days, to provide the differentials required for skilled labor. Wages must be paid at least twice a month.

Organization

The non-members of the National Lime Association are amply provided for in the new set-up of the Code Authority:

[Article VI] Section 1. A National Code Authority is hereby constituted to administer the provisions of this code, and shall consist of not more than 20 voting members. Sixteen of such voting members (one from each district designated in Schedule A of this code) shall be appointed from and by the Trade Relations Committee of the National Lime Association; provided, that each of such members is a member of the industry and a member of the National Lime Association and is truly representative of the district which he purports to represent. Four of such voting members shall be elected by members of the industry who are not members of the National Lime Association; provided, that the members elected are truly representative of the non-association members of the industry throughout the United States. Such appointments and said elections shall be subject to the approval of the National Industrial Recovery Board.

(*a*) An executive committee to consist of five members, including at least one representative of non-association members, selected from and by the Code Authority, shall be constituted and act in the capacity of supervisory agent or the general advisers to the Code Authority; provided, that the executive committee shall have no powers except as may be legally and by proper resolution delegated to it by the Code Authority, subject to the approval of the National Industrial Recovery Board.

The NIRB may select voting members to fill vacancies if the industry fails to; it may appoint three non-voting members to represent NRA. The NIRB may prescribe hearings at any time to find out if the Code Authority is "truly representative" of the industry, and if it is found not to be so, can change the method of its selection. Code Authority members are specifically exempted from personal liability, except for "wilful malfeasance or misfeasance."

The Code Authority has all the powers now possessed to compel furnishing statistics, etc. It may not spend beyond its approved budget, except with the permission of NIRB. Members of the industry must contribute their just dues under penalty of being deprived of the use "of any emblem or insignia of NRA." Dues are on a tonnage basis. The NIRB may suspend any action of the Code Authority that it deems unfair, or unjust, or contrary to the public interest.

To provide for settlement of disputes involving code conflicts with other industries, or possibly looking forward to a merger of similar industries under a single code, subsection 6 (*f*) and (*g*) of Article VI provides power to the Code Authority:

(*f*) To make recommendations to the Board for the coördination of the administration of this code and such other codes, if any, as may be related to or affect members of the industry. On the receipt of such recommendations the Board may establish a Coördination Committee and empower the Code Authority to appoint a member or members thereof so that the industry may have equal representation on said committee with any industry operating under such other code or codes, and the Board may further designate an impartial chairman. Such a Coördination Committee shall then be em-

powered to make investigations pertinent to the subject matter of the recommendation and thereafter submit its findings and conclusions to the Board. A determination of such Coördination Committee, with the supporting facts, shall be forwarded immediately to the Board and shall become effective upon approval thereby. In the event such Coördination Committee fails to act or agree, the matter shall be submitted to the Board for final determination.

(*g*) To recommend to the Board the creation of additional divisions of the industry, further trade practice provisions to govern members of the industry in their relations with each other or with other industries, and measures for industrial planning, and to call meetings of any division of the industry to consider plans for stabilization of employment and production, and conservation of natural resources; and to make recommendations thereon to the Board, such recommendations upon approval by the Board, after such notice and hearing as it may prescribe, to have the same effect as other provisions of this code.

Cost Finding

The new code provides:

[Article VIII] Section 1. The Code Authority shall cause to be formulated methods of cost finding and accounting capable of use by all members of the industry, and shall submit such methods to the Board for review. When approved by the Board, full information concerning such methods shall be made available to all members of the industry. Thereafter each member of the industry shall utilize such methods to the extent found practicable. Nothing herein contained shall be construed to permit the Code Authority, any agency thereof, or any member of the industry to suggest or agree to uniform additions, percentages or differentials or other uniform items of cost which are designed to bring about arbitrary uniformity of costs or prices.

Methods of Selling

Section 2. Each District Control Committee shall establish for each manufacturing plant within its district, subject to the disapproval of the Board, a basing point to govern all rail shipments. Different basing points may be established for different products. Said basing point, which may be changed or revised from time to time as conditions warrant, subject to the approval of the Board, shall be fair and reasonable to all interested parties. Nothing herein contained shall prevent any member of the industry from establishing his own plant as his basing point if he so desires; provided, however, that such member of the industry shall file his intention with his District Control Committee, and if there is no District Control Committee, then with the Code Authority, prior to such plant becoming a basing point.

(*a*) In the event that any district shall not have a District Control Committee, then such basing point or points shall be established for such district by the Code Authority, after first requesting the recommendation of members of the industry within such district.

(*b*) The District Control Committee shall also designate the low rate area governed by each basing point, which shall include all destinations to which the basing point has the low or equal all-rail freight rate for each Industry Product in the same rail freight classification manufactured at those plants for which the basing point has been established. Accepted geographic lines may be used as boundaries of such low rate areas, provided, that the District Control Committee shall provide for the use of the low basing all-rail freight rate for all destinations. Any District Control Committee may for any designated product manufactured within the district, establish for any plant a basing point already established by some other District Control Committee if the low rate area of such basing point is partly within the boundaries of the district designating such basing point. For the purposes of this code, the District Control Committee of District 5-A shall select a basing point for Ohio finishing hydrated lime produced in said District 5-A, and the entire United States shall become the "low rate area" for that selected basing point.

Price Publication

Section 3. Each member of the industry shall, not later than ten days after the effective date of this code, file, as provided hereafter in Subsection (*d*) of this Section 3, with a confidential and disinterested agency of the District Control Committee for the district in which the manufacturing plant is located, or if none, then with a confidential and disinterested agency of the Code Authority, identified lists of all of his prices, discounts, terms and conditions of sale, hereinafter referred to as "price terms," for each of the Industry Products manufactured and offered for sale, which price terms shall become effective at the expiration of such ten-day period and shall so file all subsequent changes therein or revisions thereof which shall become effective as hereinafter provided. All such lists shall completely and accurately conform to and represent the individual pricing practices of said member and shall contain the price terms for all such standard products of the industry as are manufactured and offered for sale by said member and for such non-standard products of said member as shall be designated by the District Control Committee and/or the Code Authority. Changes in or revisions of price terms shall become effective at 12-M midnight of the fifth day following the receipt thereof by said agency; provided that any member of the industry may file his price terms to meet those filed by another member of the industry to take effect on the effective date of the price terms so to be met; and provided further, that if a member of the industry desiring to meet the price terms of another, is unable to do so by reason of failure to receive notice of such filing prior to the effective date of such revised price terms, he may, nevertheless, file his own price terms within 48 hours after receiving notice of the filing of the price terms to be met, in which case his price terms will become effective on the filing.

(*a*) Immediately upon receipt thereof, said agency shall, by telegraph or other equally prompt means, notify said manufacturer of the time of such receipt. Such lists and revisions, together with the effective time thereof, shall upon receipt be immediately and simultaneously distributed to the members within the district interested therein, and to the Code Authority. Immediate and simultaneous distribution shall also be made to any other member of the industry interested therein, and to all customers who have applied therefor in writing and have agreed to defray the cost actually incurred by the designated agency in the preparation and distribution thereof. Copies shall be available at the office of such agency for inspection by customers of any member of the industry. Such lists and revisions, or any part thereof, shall not be made available to any person until released to those designated above as entitled to receive the same.

(*b*) The Code Authority shall maintain a permanent file of all price terms filed as herein provided, and shall not destroy any part of such records except upon written consent of the Board. Upon request the Code Authority shall furnish to the Board or any duly designated representative of the Board copies of any such lists or revisions of price terms.

(*c*) When any member of the industry has filed any revision, such member shall not file a higher price within 48 hours.

(*d*) Price terms shall be filed f.o.b. rail basing point for the low rate area in which the member's plant is located. Such price terms shall include all Industry Products manufactured at and offered for sale from such plant, and shall designate any destinations or areas beyond the low rate area in which the manufacturing plant is located to be governed by such price terms. The delivered price terms of each such Industry Product for rail delivery within such low rate area and to the designated destinations or areas beyond such low rate area shall be the sum of the price or prices filed f.o.b. basing point plus the rail freight rate from basing point to destination. For areas and destinations not included in the price terms so filed, any member of the industry wishing to meet the competition of any other member of the industry may do so, except as provided in Subsection (*f*) of this Section 3, by filing the following statement, which shall be considered the filed price terms for any destination or area not included in the price terms filed for the basing point:

"Delivered price terms to destinations or areas not covered by the price terms filed for the basing point shall not be more favorable to the purchaser than the most favorable price terms published by other Members of the Industry for the same destination or area for like Industry Products of similar grade and quality."

(*e*) Price terms shall also be filed for any shipments from manufacturing plants by truck or water, and/or any "mill pick-ups," such price terms to specify (1) the area in which any truck or water shipments will be made, (2) the trucking or water transportation charge or rate, and (3) the minimum quantity to be shipped by truck or water; provided, nothing herein contained shall prevent any Member of the Industry from meeting truck or water prices filed for like Industry Products of similar grade and quality, and provided further, that the Member of Industry meeting such filed prices shall file his own prices on like Industry Products of similar grade and quality in accordance with all the provisions for filing as provided for in this Article VIII, and specifically as provided for in this subsection (*e*) of this Section 3 of this Article VIII.

(*f*) The net realized plant price for any Industry Product which is sold for delivery in any area or destination to meet competitive price terms of another Member of the Industry as provided in Subsection (*d*) above, must not be less than 80% of the filed price for that product f.o.b. basing point. [This subsection is stayed for 90 days.—Editor.]

(*g*) In order to insure that this provision will not work a hardship on any Member of the Industry, or the customers of the industry, in any given locality, any Member of the Industry may petition the Code Authority for relief by exemption or modification of this limitation as it applies to his sales. Upon receipt of such petition, the Code Authority shall fix a date for the hearing of same within 15 days. At the same time, the Code Authority shall notify the District Control Committees of all production districts whose manufacturers ship to destinations named in the petition, as well as the District Control Committee in whose low rate area destina-

tions are located, enclosing copies of the petition and affording the opportunity for those committees and their witnesses to be heard at said hearing. Based upon the evidence submitted, the Code Authority shall render a decision within 10 days from date of hearing, submitting same, together with all pertinent testimony and facts, to the Board for its consideration. If, within 30 days after submission to the Board, such decision shall not be disapproved by the Board, the Code Authority shall advise all interested parties of the decision, which shall be final and binding upon all Members of the Industry, subject to the disapproval of or modification by the Board at any time. [This subsection is stayed for 90 days.—Editor.]

Section 4. No Member of the Industry shall sell, or offer to sell, Industry Products for which price terms have been filed pursuant to the provisions of this Article VIII, at variance with such price terms then in effect, except as otherwise provided in this Code.

Section 5. No Member of the Industry shall enter into any agreement, understanding, combination or conspiracy to fix or maintain price terms, nor cause or attempt to cause any Member of the Industry to change his price terms by the use of intimidation, coercion, or any other influence inconsistent with the maintenance of the free and open market which it is the purpose of this Article VIII to create.

Section 6. Nothing hereinabove contained shall prevent any Member of the Industry from deviating from his filed price terms in order to meet the competitive price terms of Members of the Industry shipping from plants producing like Industry Products of similar grade and quality located in other low rate areas for destinations in the low rate area in which his plant is located; provided, however, that said member shall file with his District Control Committee immediately and before quotation is made, the destination or destinations involved, and the name and delivered price terms of the competitor whose price terms are to be met.

Section 7. It shall be an unfair method of competition for any Member of the Industry to file price terms not as a bona fide expression of business policy but merely for the purpose, or with the effect, of discriminating between different purchasers of a product of similar grade and quality, or to deviate from any of the provisions of this Article VIII.

Merchandising Plans

Section 8. Each District Control Committee may prepare a uniform merchandising plan and/or system of standardization of products, containing such provisions as may be deemed necessary or proper to insure fair selling methods and to prevent unfair competitive practices by the Members of Industry selling within the low rate areas of the district. When such plans and/or systems have been so prepared for the low rate areas of any district they shall be submitted for approval to all supporting members in that district.

(*a*) When approved by supporting members who, in the preceding calendar year produced at least 60% of the total district tonnage produced in that year, such plans and/or systems shall be sent to the Code Authority for review and approval.

(*b*) Upon approval by the Code Authority, subject to approval upon review by the Board, with which copies of all such plans and/or systems shall be filed immediately, it shall be an unfair method of competition for any Member of the Industry to quote or sell Industry Products for delivery at any destination within the low rate areas of the district for which such plans and/or systems have been approved, except in accordance with the provisions thereof. [This subsection is stayed for 90 days.—Editor.]

Standard Forms

Section 9. Each District Control Committee, in coöperation with the Code Authority, shall prepare immediately standard forms for quotations and contracts for use by all Members of the Industry producing in the district, which forms shall specify the terms and conditions under which quotations and contracts for sale shall be made. When so prepared and approved by the District Control Committee such forms shall be sent to the Code Authority for review and approval.

(*a*) Upon approval by the Code Authority, subject to approval upon review by the Board, with which copies of all such forms shall be filed immediately, it shall be an unfair method of competition for any Member of the Industry to quote or sell Industry Products for delivery at any destination within the low rate areas of the district for which such forms have been approved, on terms and conditions at variance with those specified in such approved forms. [This subsection is stayed for 90 days.—Editor.]

Standards of Fair Competition for Pricing

Section 10. The standards of fair competition for the Industry with reference to pricing practices are declared to be as follows:

(*a*) Wilfully destructive price cutting is an unfair method of competition and is forbidden. Any Member of the Industry or of any other Industry, or the customers of either, may at any time complain to the Code Authority that any filed price constitutes unfair competition as destructive price cutting, imperiling any enterprise, large or small, or tending toward monopoly or the impairment of code wages and working conditions. The Code Authority shall, within 5 days, afford an opportunity to the member filing the price to answer such complaint and shall, within 14 days, make a ruling or adjustment thereon. If such ruling is not concurred in by either party to the complaint, all papers shall be referred to the Research and Planning Division of NRA which shall render a report and recommendation thereon to the Board.

(*b*) When no declared emergency exists as to any given product, there is to be no fixed minimum basis for prices. It is intended that sound cost estimating methods should be used and that consideration should be given to costs in the determination of pricing policies.

(*c*) When an emergency exists as to any given product, sale below the stated minimum price of such product, in violation of Section 11 and subsection (*a*) of Section 11 hereof is forbidden.

Emergency Provisions

Section 11. If the Board, after investigation, shall at any time find both (1) that an emergency has arisen within any designated area adversely affecting any enterprise, large or small, or wages or labor conditions, or tending toward monopoly or other acute conditions which tend to defeat the purposes of the Act; and (2) that the determination of the stated minimum price for a specified product within such designated area for a limited period is necessary to mitigate the conditions constituting such emergency and to effectuate the purposes of the Act, the Code Authority may cause an impartial agency to investigate costs and to recommend to the Board a determination of the stated minimum price of the product affected by the emergency and thereupon the Board may proceed to determine such stated minimum price.

(*a*) When the Board shall have determined such stated minimum price for a specified product for a stated period in such specified area, which price shall be reasonably calculated to mitigate the conditions of such emergency and to effectuate the purposes of the Act, it shall publish such price. Thereafter, during such stated period, no Member of the Industry shall sell such specified products in such specified area at a net realized price below said stated minimum price and any such sale shall be deemed destructive price cutting. From time to time, the Code Authority may recommend review or reconsideration, or the Board may cause any determination hereunder to be reviewed or reconsidered and appropriate action taken.

The redraft of trade practice rules is a better job of law making but covers essentially the same ground as the original code.

Contracts

The following provisions regarding the nature and duration of contracts are of general interest:

[Article IX] Section 17. All bona fide contracts and/or order for shipments for specific jobs and/or period requirements may be shipped at the price specified in the contract and/or order, regardless of any subsequent price increase, and any Industry Product so shipped must be applied only on such contract and/or order.

(*a*) In the event of any advance in the price or prices or a sale at less than a listed price of Industry Products by a Member of the Industry, such member shall, within 30 days, file with a confidential and disinterested agency of his District Control Committee a list of all uncompleted contracts and/or orders made or entered into prior to the price increase, giving the name of customer, total tonnage required, price and expiration date; and, in the case of specific building job contracts, the name of the job, its location, the dealer, the contractor, unshipped tonnage, and price, with a certification from the dealer that he has a bona fide contract with the contractor and/or owner covering such products, and shall report to such agency of his District Control Committee all shipments made on any such contracts and/or orders as and when the same are made and also shall report completion, cancellation, or modification thereof, and may report information concerning any other member's listed contracts and/or orders.

(*b*) All contracts made within 30 days (except Government jobs made to meet requirements of proposals or applicable law) after any price increase but based upon a quotation made prior thereto may be shipped at the contract price regardless of any price increase, provided that on all such jobs the contract and/or contracts involving industry products has been awarded prior to the expiration of the 30-day period following the date of price increase, all such contracts must be filed with such agency of the District Control Committee in the manner aforesaid within 15 days after said 30-day period (or such other period stipulated by Governmental proposals or applicable law). Such agency of the District Control Committee shall promptly disseminate to Members of the Industry concerned all information pertaining to such specific building job contracts and/or orders, and in the case of other contracts, information regarding the validity of any specific contract or commitment so filed shall

be given to any Member of the Industry upon request.

Section 18. Duration of Contracts. Except where otherwise necessary to meet Governmental bid requirements, no Member of the Industry shall make any quotation for a period in excess of 15 days from date of quotation; provided, however, that any such quotation may be specifically renewed for a like period upon request of the prospective purchaser.

(*a*) Chemical Lime. No member of the Industry shall contract or agree to furnish chemical lime to any purchaser for more than a calendar quarter-annual period; nor shall he make any quotation, contract, or agreement for the sale of lime for any such calendar quarter-annual period, prior to the first day of the last month of the immediately preceding calendar quarter-annual period.

(*b*) Building Lime. In instances where building lime is sold for specific jobs in lieu of making specific job contracts with dealers and processors, a purchase order at the prevailing price will be considered as a sufficient binding contract with the provision that if the price advances at any time, a specific job contract will be written within 30 days after the price advance at the price prevailing at the date of the purchase order for the amount of lime still required. Specific job contracts must be supported by the dealer's original order and record of prior deliveries, if any, and the contractor's written estimate of the balance required for completion. Where no specific job contract is made within 30 days after the price advance, then such jobs must take the advanced price.

(*c*) Agricultural Lime. No Member of the Industry shall contract or agree to furnish agricultural lime to any purchaser for more than a calendar semi-annual period, nor shall he make any quotation, contract, or agreement for the sale of such product for any such calendar semi-annual period prior to the first day of the month immediately preceding such calendar semi-annual period.

(*d*) Government Purchases (Federal, State, County, Municipal and/or Political Subdivision). Each bid shall specify that it shall be void if award shall not be made and contract executed within 30 days after date of the opening of bids; and only calendar quarterly contract shall be accepted, unless otherwise specified in the proposal or by applicable law, but in no case for any period longer than one year.

Conclusions

We have quoted salient points in the new or revised code at length because it is one of the first codes to be entirely rewritten—presumably to bring the experience and policies of NRA to date. On the whole, it seems to ROCK PRODUCTS to be a better code than the original, and to us there seems ample evidence that NRA is willing to go as far as it can legally to help industry along the road to actual self-government.

Sand-Lime Brick Production and Shipments in March, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick, located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Seven sand-lime brick plants reported for the month of March, this number being one less than the number reporting for the month of February, statistics for which were published in April.

Average Prices for March

	Plant Price	Delivered
Iona, N. J.	$12.00	....
Mishawaka, Ind.	9.25	....
Syracuse, N. Y.	14.00	$16.00-$20.00
Saginaw, Mich.	10.50	....
Toronto, Ont., Can.	12.00	13.50

Statistics for February and March

	February†	March*
Production	154,825	114,800
Shipments (rail)	13,000	20,000
Shipments (truck)	266,105	413,997
Stocks on hand	1,363,426	810,514
Unfilled orders	100,000	925,000

†Eight plants reporting; incomplete, three not reporting unfilled orders.

*Seven plants reporting; incomplete, two not reporting unfilled orders. The figure showing unfilled orders includes 600,000 brick for PWA.

Lime

Peerless White Lime Co., Ste. Genevieve, Mo., has recently improved its hydrating plant by installation of a 12-ft. Raymond Bros. "Whirlwind" separator, used in connection with a 6-ton Kritzer hydrator. The product is said to be 99.9% passing a 325-mesh screen. The company is also preparing to put its No. 10 kiln into operation. This kiln was installed five years ago, but never has been used. It is a very large one, 85 ft. from gas burners to top of stone hopper. It was designed by Victor J. Azbe for a capacity of 70 tons of lime per 24-hrs.

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Sheboygan Lime Works, Sheboygan, Wis., was placed in involuntary bankruptcy on April 1 with liabilities listed of $71,240 and assets of $121,314, of which $113,805 is real estate. Elfrieda H. Roth is president.

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Calhoun Lime Co., St. Matthews, S. C., is considering installation of additional equipment, including rotary dryers and auxiliaries. B. E. Bensen is president.

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Statistics: Data collected by the Trade Relations Committee of the National Lime Association are in part as follows:

Chubbuck Lime Co., South San Francisco, Calif., suffered a $5000 loss by fire April 2.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for March, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during Mar., 1935	Total sq. yd. for year to date, Mar. 30, 1935
Roads	1,978,448	6,017,496
Streets	544,901	2,097,303
Alleys	17,194	28,404
	2,540,543	8,143,203

Crushed Stone

Bell Stone Co., Pineville, Ky., has been organized by Robert Maxwell, Winchester; Leon Muckols and James H. Jefferies, Pineville. A long term lease has been made on a limestone property and a crushing plant is to be built to have 1000 tons per day capacity.

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General Crushed Stone Co., Easton, Penn., was denied its application to build a bituminous concrete plant in Worcester, Mass., on the site originally applied for. Nearby residents objected to possible noise and dust. However, the application has been renewed for another site not so near a high-class residential neighborhood.

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Hallett Construction Co., Kellogg, Minn., suffered a loss of several thousand dollars from an explosion which destroyed the building housing its quarry, electric power plant and air compressors.

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Pennsylvania is considering a severance tax of 5c per cu. yd. on stone and gravel as a new source of state revenue.

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C. C. Beam, Inc., Melvin, Ohio, has purchased the George Hyer Quarry, Washington Court House, Ohio. This is wholly a trucking operation. There is no rail connection.

◈ ◈ ◈

Standard Asphalt Paving Co., operator of quarries and crushing plants, Spokane, Wash., has taken into its organization Fred Redmond, Yakima, Wash., contractor and gravel producer, to supervise its rock crushing operations, succeeding Otto J. Amberg, who has retired because of ill health.

TABLE 1. TOTAL SHIPMENTS AND CAPACITY*

Month	Total Capacity represented, short tons	Total Shipments reported, short tons	Average value per ton	Ratio shipments to capacity, per cent												
				United States	Lime 1	2	3	4	5B	Manufacturing 6–8–9	7	Districts 10–11	12	13	14	15
1934—																
November	404,887	119,561	$7.61	29.5	16.4	25.7	32.0	41.8	28.3	23.1	42.5	37.4	22.2	18.0	23.0	21.1
December	404,970	109,247	7.25	26.9	14.5	20.7	34.7	35.2	26.5	21.1	39.2	33.9	14.9	11.4	24.5	16.9
1935—																
January	397,305	125,372	7.24	31.6	14.4	21.9	42.7	38.0	30.9	20.7	46.2	43.3	21.1	16.4	31.6	17.2

*All data relate to competitive lime. Total capacity under Table 1 includes the following capacity reported as idle; November, 11,016 tons; December, 11,026 tons; January, 10,581 tons.

Financial Survey of the Portland Cement Industry

Michael F. Demshar
Industrial Engineer, Columbia University, New York City.

THE THEORY of the Rautenstrauch "Break-Even" chart rests on the hypothesis that as all enterprises have both fixed and variable costs, there is at some point of operation, expressed in per cent of capacity, units of product sold, or amount of revenue, a point of intersection between profits and losses. This point is termed the "break-even" point and is found on the chart at the crossing of the cost and income lines. For simplicity, the income line is always laid out on a forty-five degree angle by choosing the same scale for the ordinates and abscissas.

This chart, by plotting estimated costs, may be used as a budgeting tool ("Budgeting an Industrial Enterprise," by Walter Rautenstrauch; *A. S. M. E. Transactions*, November, 1934), and by plotting net incomes over a period of years, may be used to show trends reflecting the inherent characteristics of the enterprise ("The Evaluation of Industries," by Walter Rautenstrauch; *Bulletin of the S. I. E.*, January-February, 1935; and to be presented at the International Management Congress, in London, during the summer of 1935). Applied in this manner, it is essentially a dynamic graphic portrayal of income statements, much to be preferred to the static method of presenting columns of figures, and in this capacity its use is set forth in this article.

From an examination of their costs, it can be readily seen how different companies, though doing the same type of work, can have different types of charts. Fixed costs essentially consist of:

Interest charges Depreciation Amortization Taxes Rent Insurance	Fixed by inherent characteristics of the business
Salaries Appropriations	Fixed by executive policy

Variable costs comprise all others as:

Raw materials.
Indirect materials.
Direct labor.
Indirect labor.
Light, heat and power.

These cost items will vary with the extent of operation, so that the cost line will usually take the form of a cubic equation; but for periods of normal operation, it can be closely approximated by a straight line. For these periods, most companies follow a definite policy of management, which gives a straight line function. Changes in bookkeeping methods, such as juggling with figures of depreciation, amortization, etc., will also give departures off the trend, as will be noted by an examination of the 1930 point on the accompanying chart. To interpret this clearly, a close examination and intimate knowledge of the company histories is necessary; but such an interpretation is not attempted here.

Author's Note

BY THE USE of the Rautenstrauch Break-Even Chart this article attempts to show how the portland cement industry has prepared itself for operation at a relatively small percentage of capacity so as to at least break even and probably to show some profit.

A group of companies whose financial data are available was used in the study. The method, of course, is one that can be applied to the study of a single company's operations more intelligently, because more of the intimate financial data would thus be available.

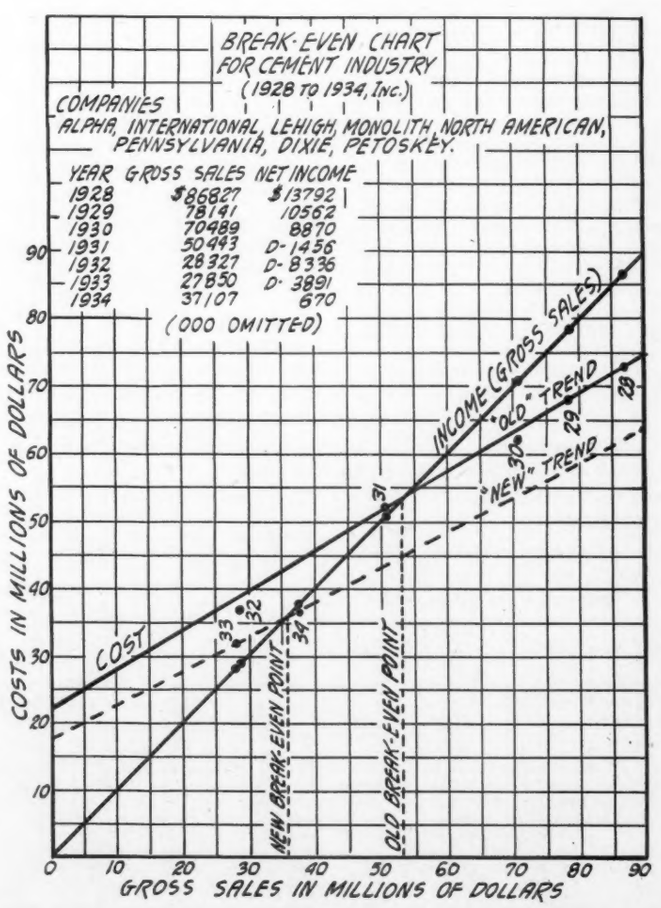
Also, of course, the same method of analysis could be applied to any group of rock products operations. For that reason this article should prove interesting and helpful to all operators who are anxiously and intelligently trying to adjust themselves to present conditions.

—THE AUTHOR.

The accompanying chart was drawn from existing data (tabulated in the accompanying table) from all the portland cement companies publishing complete financial reports in Moody's and Poor's Industrial Manuals, Crandall's Corporation Analyst, and Standard Corporation Records. Further reports were not available, as many companies submit none; others were incomplete; and still others were submitted as subsidiaries of holding concerns, making it impossible to unscramble the figures. To have this analysis indicative of the entire portland cement industry, the companies presented must be assumed to represent the entire field, with relation to both capacity and geography, and in defense of this assumption the following is presented:

Description and Location of Companies

Alpha Portland Cement Co., operating 10 plants, situated in Michigan, Alabama, New



The Rautenstrauch "break-even" chart used to analyze typical cement company financial data

York (2), Illinois, West Virginia, Pennsylvania, Ohio and Missouri (2); having a total of 55 kilns, under both wet and dry process, with an annual capacity of 13,000,000 bbl. The company is cited as having a low-cost production.

Lehigh Portland Cement Co., operating 15 plants, situated in New York, Pennsylvania (6), Maryland, Virginia, Alabama, Indiana, Illinois, Iowa, Kansas and Washington; under both wet and dry process, with an annual capacity of 25,000,000 bbl.

The International Cement Corp. is a holding company operating three plants in South America, having an annual capacity of 6,000,000 bbl.; and 10 plants, situated in Alabama (2), Indiana, Kansas, Louisiana, New York, Pennsylvania, Texas (2), and Virginia; having a domestic capacity of 18,000,000 bbl. annually.

Monolith Portland Cement Co., operating a single dry process plant at Monolith, Calif.; having a daily capacity of 4000 bbl.

North American Cement Corp., operating three plants, situated in New York (2), and Maryland; under both wet and dry process, and having an annual capacity of 4,450,000 bbl. This company also produces lime in Maryland.

Pennsylvania-Dixie Cement Corp., operating eight plants, situated in Tennessee (2), Georgia, Pennsylvania (3), New York, and Iowa; under both wet and dry process, having an annual capacity of 12,200,000 bbl. It is reported that this company is relatively the most affected by foreign imports of portland cement.

Petoskey Portland Cement Co., operating a single plant at Petoskey, Mich.; having four kilns under wet process, with an annual capacity of 1,500,000 bbl. This company is also engaged in crushed stone production, having an annual capacity of 500,000 tons.

Relative Position of Companies in Industry

Total capacity of companies (annual)—75,000,500 bbl.—approx. U. S.

Total capacity of industry (annual)—269,387,000 bbl.—Bur. of Mines.

Per cent—28.0%.

Total plants of companies—48.

Total plants of industry—152 active in 1933—Bureau of Mines.

Per cent plants—31.6%.

Total revenue of companies in 1933—$27,850,000.

Total value of cement sales in 1933—84,419,341—Bureau of Mines.

Per cent—33.0%. (This figure can be used only as a maximum due to sales of International in South America, revenue of North American in lime; Petoskey in crushed stone, etc.)

Analysis of the Chart

From an analysis of the chart in conjunction with prices and production (W. S. Mallory, Cement Institute), one can draw the following conclusions:

(1) That during the period of 1928 to 1931, inclusive, a period of falling production and prices (— 29.6 and — 29.3%, respectively), there was a definite trend, with but little or no change in major managerial policies.

(2) That during 1932, also a period of falling production and prices (— 34.6 and — 9.0%, respectively), there was an attempt made to adjust the situation by cutting costs.

(3) That during 1933, a period of falling production, but rising prices (— 22.2 and + 31.6%, respectively), this attempt was continued and probably furthered, resulting in a much better operating economy.

(4) That during 1934, a period of rising production and prices (about + 20.0 and + 15.0%, respectively), the trend may be a following of 1933, which should result in a stable operating economy, with but little increase in prices or production.

From a mathematical analysis of the chart, the following is evident:

(1) The lowering of the value of the *y*-intercept of the cost line means a lowering of the fixed costs (21.2%).

(2) The lowering of the value of the slope of the cost line means a lowering of the variable costs (0.582 to 0.512).

(3) The change most evident is the change in the "break-even" point; any company following this new trend should be able to show a profit at approximately a 32.6% reduction in revenue over its old "break-even" point.

With relation to other factors, the following may be stated:

(1) That the profitable change has been greatly accelerated by the rise in prices; 51.5% over 1932.

(2) That during 1934 there has been a very small increase in inventory.

(3) That there has been relatively little change in total capacity in recent years.

(4) That for raw material prices, there has been a slight increase in costs of cement rock and limestone or shale; and an increase in prices of gypsum, coal, and operating supplies (about 3, 7, and 6%, respectively).

(5) That the adverse influence due to increase of wage rates, as a result of the NRA, has not materially affected the trend.

Conclusions

A study of the individual "Break-Even" Charts of the various companies represented, shows practically the same definite trend; some are somewhat erratic and others more regular. If one can assume that the group of companies selected represents the portland cement industry, as a whole, then it is evident that the situation at present is well in hand; that the industry has planned for limited operations in methods and costs, and that during 1935 the industry should definitely return to a profit-making basis.

Cement

Lehigh Portland Cement Co., Allentown, Penn.; J. C. Shumberger, controller, has an article in the *Executive Service Bulletin* of the Metropolitan Life Insurance Co., describing present-day aspects of the controller's functions.

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Southern Cement Co., Birmingham, Ala., has appointed the International Non-Staining Cement Co., Inc., New York City, its exclusive representative for the Magnolia brand stainless cement in the metropolitan district.

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Arkansas Portland Cement Co., Okay, Ark., has just installed a dust-collecting system in its mill building. The dust, or fine ground cement, is taken from the mills, screw conveyors and elevators; 14-in. leads take the dust from the mills, and 10-in. leads, cutting down to 6-in. collect the dust from the conveyors and elevators. A Norblow (Northern Blower Co.) bag type dust collector is used. The collector discharges to a screw conveyor which feeds back into the main conveyor. This feeds Fuller-Kinyon pumps to the silos. Besides making the mill building practically dust free, the mills are kept cooler, and their capacity is increased.

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National Cement Co., Ragland, Ala., has put a crew of men to work preparing the plant for a resumption of operation after a long shut down. The quarry has been pumped out and one kiln has been placed on production.

GROSS SALES AND NET INCOME (000 OMITTED) OF SOME OF THE LEADING CEMENT COMPANIES

Year	—1928—		—1929—		—1930—		—1931—		—1932—		—1933—		—1934—	
Company	Sales	Income	Sales	Income	Sales	Income	Sales	Income	Sales	Income	Sales	Income	Sales	Income
Alpha	$13,547	$ 2,585	$11,369	$ 1,815	$ 9,937	$1,248	$ 6,013	*$ 779	$ 3,858	*$1,763	$ 4,075	*$ 604	†$ 4,583	*†$260
International	27,595	5,149	28,370	4,950	27,038	4,539	20,087	1,358	11,109	* 1,436	10,852	* 102	† 13,138	‡ 658
Lehigh	23,523	4,124	19,347	2,737	16,700	2,106	12,292	79	6,386	* 1,998	6,456	* 847	9,422	849
Monolith ...	2,630	283	2,421	219	1,721	21	1.452	* 5	1,102	* 162	1,527	144	‖ 1,527	‖ 144
No. American	5,539	181	4,863	282	4,585	263	3,293	* 497	1,737	* 830	1,525	* 742	2,627	* 139
Penn-Dixie..	11,838	1,294	9,611	332	8,625	587	6,118	* 1,359	3,477	* 1,866	2,736	* 1,675	4,642	* 692
Petoskey ...	2,155	176	2,160	227	1,883	106	1,178	* 253	658	* 281	679	* 65	1,168	110
Totals ...	$86,827	$13,792	$78,141	$10,562	$70,489	$8,870	$50,443	*$ 1,456	$28,327	*$8,336	$27,850	*$ 3,891	$37,107	$ 670

*Deficit.
†12 months ending September 30, 1934.
‡Estimated by Standard Statistics Co.
‖Not reported; estimated same as last year because of local conditions, also with relation to 1933 capacity and gross sales.

Rock Products News Briefs

Cement

Birmingham, Ala.: Local newspapers say that the cement mills here are operating 40% of capacity and expect 60% capacity operation soon. U. S. War Department and TVA construction are counted on to develop a large demand.

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New York City: The *Journal of Commerce* states: "Cement producers are revising upward earlier estimates of total production this year, owing to the probability that a substantial impetus to cement output will result from the Administration's work relief program. Due to the allocation of some $800,000,000 for highway construction, it is estimated highway awards this year may be double those of 1934. Even greater increases may be recorded in States where proceeds of vehicular taxes and licenses have been diverted to other than highway purposes in the past two years, cutting down road work to an abnormally low level. The Administration is reported considering the erection of all-concrete apartments as part of the low-cost housing program. Furthermore, the rapid development of pre-fabricated concrete houses may lend an impetus to increased use of cement in residential construction in the near future, it is expected."

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Marquette Cement Manufacturing Co., Chicago, Ill.: officers and directors of the company tendered a dinner to Richard Moyle, Sr., vice-president in charge of operations, at the Palmer House, Chicago, on March 25, in honor of his 67th birthday. The party was held in a private dining room. Mr. Moyle having come from England, the party was strictly along English lines. The music was furnished by a string ensemble under the direction of Mr. Ginsberg of the Palmer House, who also directed the Cornwall Cadets. Mr. Ginsberg had arranged a delightful program of English music, some of it representing the childhood days of Mr. Moyle. Mr. Moyle was presented with an engrossed and illumined testimonial of appreciation. Each guest wrote his own letter of appreciation, which in turn was hand lettered and illumined and then bound in book form and presented to the honored guest. There were 22 guests present, all members of the company. A program was especially prepared for the occasion, with each guest's name; and a picture was taken of the party, which was furnished to each guest so that he can include it in the program and thereby have a complete record of this most enjoyable affair.

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Marquette Cement Manufacturing Co., Chicago, Ill., is installing B & W pulverizers for direct firing of a number of its kilns at Oglesby, Ill.

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Great Britain: As in the United States, much of the business of British portland cement manufacturers is coming directly or indirectly as a result of government public works construction; while in the United States the government apparently begrudges every dollar of profit earned, in Great Britain it is different. The Associated Portland Cement Manufacturers, Ltd., is proposing to raise its common share dividends from 7 to 10%; the British Portland Cement Manufacturers, Ltd., has raised its common dividend rate from 15 to 17½%; the Ketton Portland Cement Co. pays 5%. Perhaps this is one of the reasons Great Britain is farther along the road to recovery than is the U. S. A.

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British Portland Cement Manufacturers, Ltd.: At the recent ordinary general meeting of this company, P. Malcolm Stewart, the chairman, said the past year would stand out in the history of the company not only because it witnessed the repayment from its own resources of the whole of the 5% first mortgage debenture stock, but, further, because record tonnages of cement were produced and delivered. Increased turnover and reduced costs of production offset the low selling prices experienced. The revenue has also benefited by the improved dividends received from its investments in subsidiary and allied companies. Better trading conditions in South Africa and India particularly helped to secure these results. The consistent policy carried out of keeping the works up to date, also of steadily extending them while at the same time providing generously for depreciation, has resulted in the balance-sheet figure representing fixed assets being far below the cost of their replacement today. "The prospects for the current year are promising," he added. "As low price contracts expire they are gradually being replaced by those of a more favorable character owing to the stabilization successfully effected by the Cement Makers' Federation. I anticipate the maintenance of a good demand from house building and look for some improvement from larger constructional operations, which last year were quiet. Consequently, if nothing occurs to disturb the present generally favorable trading conditions you may look forward to our again submitting to you a satisfactory report when we meet next year."

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Superior Portland Cement, Inc., Seattle, Wash., has placed in operation the Pacific Coast Steamship Co.'s steamship *Diamond Cement* to bring limestone from Dall Island, Alaska, to the Pacific Coast Cement Co.'s plant at Seattle, which is operated under lease by the Superior Portland Cement, Inc. The ship has been away from Seattle for two years, the plant having operated on its storage piles.

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Spokane Portland Cement Co., Irvin, Wash., is rushing completion of a $250,000 improvement program in preparation for furnishing cement to some of the Northwest PWA projects. The improvements include several new concrete silos. The company has installed as a part of its improvement program B&W mills for pulverizing coal and direct-firing of its rotary kilns.

Marquette Cement Manufacturing Co. executives honor "Dick" Moyle on his 67th birthday with an "English" dinner

Rock Products News Briefs

Gypsum

United States Gypsum Co., Chicago, Ill., has purchased the plant of the Stewart Inso Board Co., St. Joseph, Mo. The new owners will continue to manufacture the same line of insulating materials as the Inso Board company produced, and the same organization of employes will be retained, with A. G. Gibson in the capacity of works manager. Mr. Gibson helped in the construction of the plant and has been in the employ of the Inso Board company since it was started. The materials manufactured at the plant include insulated building board, lath, tile board and roofing, and special products for industrial use.

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Cardiff Gypsum Co., Fort Dodge, Ia., has evolved a plan for reorganization under the federal bankruptcy law, following an involuntary suit in the federal court at Fort Dodge, brought by Arkell & Smith, Chicago, Ill., creditors.

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Sand and Gravel

R. L. Foster, Swainsboro, Ga., is reported to have organized a company to exploit a building sand deposit on the farms of W. M. Karrh.

◈ ◈ ◈

A. H. Stovall and N. B. Bowker, Ventura, Calif., have applied to the county board of supervisors for permission to establish a sand and gravel plant on the Santa Clara river.

◈ ◈ ◈

Gravel Products Corp., Buffalo, N. Y., has been awarded a contract for 140,000 tons of sand and gravel to be used in the construction of the new Bethlehem Steel Co.'s sheet rolling mill at Lackawanna, N. Y.

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Lake Ontario Sand Co., Rochester, N. Y., was formally dissolved on March 28 in a Supreme Court order of voluntary dissolution. The company was organized in 1917 and for a number of years operated a suction dredge known as the *Commodore Jarvis,* which was sold several months ago.

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Muskegon County, Mich., road commissioners are reversing the present trend toward production of aggregates by publicly-owned plants and are asking bids on 40,000 cu. yd. of sand and gravel. The commissioners decided that they could buy cheaper than produce at the county's own pit with its antiquated machinery. Hundreds of counties in the East had the same experience in years past.

Zanesville Gravel Co., Zanesville, Ohio, John J. Gorman, president and general manager, is building a new plant on the Muskingum river near Conesville to supply sand and gravel for the construction of the Wills Creek dam, a flood control and water conservancy PWA project. Sand and gravel will be removed from the river bed by a cableway excavator; the plant will have a capacity of 750 to 800 tons per day. Deliveries to the dam site will be by motor truck.

◈ ◈ ◈

J. L. Shiely Co., Cole, Mont., plant for furnishing sand and gravel for the Fort Peck dam project on the Missouri river, has been equipped with facilities for washing all the product. The capacity of the plant has been increased 100 cars a day.

◈ ◈ ◈

West Jefferson Sand and Gravel Co., West Jefferson, Ohio, is reported to be in active production; permission has been asked of the village council to build a spur track from the local interurban electric line to the plant.

◈ ◈ ◈

New Hope Gravel Co., Columbus, Miss., has been purchased by Waters & McCrary Gravel Co., Columbus, which has operated the New Hope company under a lease for the past two years. This acquisition is said to make the Waters & McCrary Gravel Co. one of the largest producers of clay road gravel in the state.

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Herman Irey, Marion, Ohio, has leased the Hackett farm in Harmony, Ohio, and has installed equipment to produce road gravel.

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Gifford-Hill Co., Inc., Dallas, Tex., is reported to be very busy at its Hoot, Tex., plant producing washed gravel ballast for the Texas and Pacific Ry.

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Arkadelphia Sand and Gravel Co., Arkadelphia, Ark., has recently changed its operation from dredging to drag-line. Seven acres of clay-free material were recently opened up, with overburden 1½ to 5 ft. Formerly a 10-in. pump dredge was used. Now a P&H, 1¼-cu. yd. dragline has been set up, loading 5-cu. yd. Western side-dump cars, hauled by a 7½-ton Plymouth locomotive. Production capacity was increased 25 to 40%.

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Consumers Sand Co., Topeka, Kan., has been chartered with a capital of $25,000, succeeding the former company of the same name. All except five shares of stock is held by the bondholders' committee of the old company, composed of Balfour Jeffrey, Clayton Kline and M. F. Cosgrove. The five shares are apportioned, one share each, to Robert Russell, F. C. Clark, and the three comprising the bondholders' committee.

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Mobley Construction Co., Morrilton, Ark., recently dismantled its plant at Ozark, Ark., and has moved part of the machinery and equipment to Newport, Ark., where it is now operating a floating plant to supply washed gravel for state concrete roads. The new location puts the company in a much more favorable location with respect to the market for washed gravel. The plant is a temporary one, which will probably be operated for approximately three months. The gravel is taken from the White River at a point ¾ mile upstream and is pumped by a 15-in. 190 hp. Diesel driven pump into barges. Three 200-ton capacity barges are used, one being loaded, another being unloaded, and the third being in transit. A 120-hp. Diesel tug is used to tow the barges. A Thew-Lorain ¾-yd. gasoline driven clamshell, mounted upon the floating plant, is used for unloading the mixture of sand and gravel into a 5-yd. hopper. A bucket conveyor is used to carry the material to the top of the plant and into the rotary screens, where it is washed by water pumped into them and into the screw washers (Eagle Iron Works) by a 20-hp. 6-in. pump. After passing through the screens, the gravel is separated and drops into two bins used for the two sizes. Trucks, 1 cu. yd., with end dumps, are driven under the bins and loaded, then backed up a 15% incline to a 1½-yd. hopper about 100 ft. from the plant, near the railroad track. An 18-in. portable conveying belt picks the material up from the discharge of this hopper and takes it to the railroad cars. A Universal rewasher vibrating screen at the upper end of this conveyor is supplied with a 2-in. discharge of water and the gravel is rewashed as it goes into the cars. The sand from the plant proper is discharged with the wash water into the river next to the bank, where it is picked up by a pipeline and pumped to a classifying unit near the railroad siding. A Thew-Lorain 75 gasoline shovel-crane with a 1-yd. bucket is used for loading sand and for utility purposes around the plant. Besides furnishing washed sand and gravel, the plant furnishes a gravel with sand filler which is mixed at the plant and used for secondary roads. The capacity of the plant is about fifteen 50-ton cars in a 16-hour day. The company has built three permanent storage bins having a capacity of 21 cars and is making preparations to build a permanent plant at the site. The Mobley Construction Co. has installed a Telsmith Gyrosphere 24-in. reduction crusher at its Dardanelle, Ark., plant. The installation is a temporary one to furnish material for reconditioning state roads, so as to avoid stock piling. Capacity is 40 tons per hour.

Rock Products News Briefs

Cement

Olympic Portland Cement Co., Bellingham, Wash.. has purchased a quartz deposit near Sumas, Wash. The silica will be quarried and crushed for use in the manufacture of certain types of cement. The company is reported to be spending $40,000 to $50,000 on new equipment at its Bellingham plant.

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Statistics: The portland cement industry in March, 1935, produced 4,299,000 bbl., shipped 4,877,000 bbl. from the mills, and had in stock at the end of the month 21,319,000 bbl. Production showed a decrease of 18.2% and shipments an increase of 5.6%, as compared with March, 1934. Stocks at mills were 0.5% lower than a year ago. The total production for the first quarter of 1935 amounts to 10,554,000 bbl., compared with 13,204,000 bbl. in the same period of 1934, and the total shipments for the first quarter of 1935 amount to 10,675,000 bbl., compared with 11,348,000 bbl. in the same period of 1934; decreases, respectively, of 20.1 and 5.9%. The statistics here given are compiled from reports for March, received by the Bureau of Mines, from all manufacturing plants except one, for which an estimate has been included in lieu of actual returns. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of March, 1935, and of 163 plants at the close of March, 1934.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	March 1934	March 1935	Feb. 1935	Jan. 1935	Dec. 1934
The month....	23.0	18.9	14.9	14.1	19.5
The 12 months ended	25.0	28.0	28.4	28.8	29.0

Freight Rate Increase

THE Interstate Commerce Commission authorized emergency freight rate increases for a period of one year (Ex Parte No. 115) ending June 30, 1936, which affect nearly all rock products except rates on crushed stone, sand and gravel, and slag, where the line haul rate is now $1.00 per net ton or less, including, with one exception, special sands hauled in open top cars. Rates in excess of $1.00 may, in general, have an emergency increase applied to them of as much as one cent per hundred pounds (20 cents per ton). In the case of gravel and sand, industrial, hauled in closed cars, and naturally bonded moulding sand in either open or closed cars, rates at any level may be increased as much as two cents per hundred (40 cents per ton). The decision also leaves unaffected rates established to meet truck and water competition, where such rates are so designated in the tariffs.

Cement and lime rates are increased 20c per ton; plaster, 40c; gypsum blocks, 40c; phosphate rock, 20c. There is no increase on brick and building tile where the line haul rate is 7c per 100 lb. ($1.40 per ton) or less. Artificial stone rates are increased 40c per ton. Special rock products rates, such as on barytes, fuller's earth, tripoli, diatomaceous earth, fluorspar, ground limestone, etc., are increased 40c per ton.

Correction

THE EDITOR: In the March, 1935, issue of Rock Products, a news item appeared as follows:

Mildred, Kan.: It was recently reported that legal steps are in process tending toward the resumption of control by Wm. Volker of Kansas City, Mo., of the cement plant at Mildred, Kan., which he successfully operated a number of years ago.

I believe you would want to be advised that Rock Products is erroneously informed in this matter.

The facts are that the Consolidated Cement Corp. has been in receivership and it is expected that the reorganization will be completed (under section 77-b of the Bankruptcy Act as amended) the latter part of April, 1935. So far as I am advised Mr. Volker has no part in the reorganization, nor does he, as far as I know, have any interest in being a party to anything that concerns the Consolidated Cement Corp. or any of its properties.

Smith W. Storey, Trustee.

Chicago, Ill.
March 28, 1935.

New Cement Machinery Manufacturer

CADILLAC ENGINEERING AND MANUFACTURING CO., Detroit, Mich., is the name of a new concern to design and manufacture machinery and equipment for the portland cement industry—air-quenching clinker coolers, slurry dryers, grinding media, and special equipment and services of various kinds. Arthur F. Miller, president, has been associated with the portland cement industry in various capacities since 1907. He is a recognized authority on grinding, classification and special cements. Entering private practice as consultant in 1920, he introduced many improvements in plant design, machinery, and methods of manufacture. Mr. Miller was among the first to recognize the possibilities of air quenching commercial clinker cooling machinery, first installed under his supervision in 1931. The installation consisted of 11 units in two plants of one company.

Arthur W. Roehm, vice-president, formerly secretary-treasurer of the H. S. Lee Corp., and the Cement Mill Equipment Co., has had ten years' experience in the manufacture and sale of heavy machinery and equipment. In addition to his duties as vice-president of Cadillac Engineering and Manufacturing Co., Mr. Roehm is factory representative for the Cadillac Malleable Iron Co., Cadillac, manufacturers of malleable iron and special alloy iron castings.

Homer S. Harrison, chief engineer, has likewise had extensive experience in design, manufacture and erection of various kinds of machinery. Formerly with the H. S. Lee Corp. and the Cement Mill Equipment Co., in a similar capacity, Mr. Harrison supervised manufacture and erected air quenching clinker cooler units of the drag chain type now in operation.

Other officers include C. M. Verbiest, secretary, and L. G. Goodrich, treasurer, associates of Mr. Broderick in other enterprises.

The company is presently engaged in numerous projects and improvements involving the portland cement industry in both the United States and foreign countries.

New California Explosives Plant

HALAFAX EXPLOSIVES CO., near Saugus, Calif., is a new industry, which began operation the latter part of April, producing a full line of industrial explosives, from low strength free running to the higher nitroglycerine equivalents. The plant cost about a quarter of a million dollars and is said to be up-to-date in all respects.

Halafax powders are claimed by the manufacturers to be an outstanding advance in explosive chemistry. By reason of the fact that the explosive is a departure from any previous type insofar as its field application is concerned, preliminary design of the factory units brought to light many problems. As a result, the Halafax factory is said to contain many plant methods and equipment new to the industry.

Prior to plant erection, five years were spent in testing Halafax explosives. Most of 1935 was taken up with exhaustive tests in Mexico. Final field and engineering determinations were made in 1934 in the contracting, mining and quarrying industries in California. Halafax powders are claimed to be insensitive to sudden changes of temperature, virtually unaffected by freezing and by extreme heat. In addition, they are claimed to be cheaper, from the consumer's standpoint.

In common with the gravity system used in other powder factories, the raw material for Halafax powders is delivered to a warehouse and storage quarters located at a point higher than that of any process unit in the plant. From separate material storage to dry batch, thence to explosive mix, shell pack, and on to final pack house, through successive stages, the product is carried by gravity until it is delivered at the lowest point in the plant, the site of the magazine.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Long Island City, N. Y.

The Effect of Fluorides on the Thermal Synthesis of Calcium Silicates. The formation of tricalcium silicate is greatly helped by the presence of small amounts of CaF_2, but the mix has to be heated to 1250 deg. C. or higher to secure much combination. When a dry mix was used, about 70 to 80% of the fluoride was retained in the clinker, but in the presence of moisture, about half of the remainder was eliminated. *Journal of the Society of Chemical Industry, Japan. Supplemental Binding* (1934) **37,** No. 10, p. 549-B.

Cement Stucco in Cold Weather. Results obtained in recent years in Russia, as described by W. Wichmann, indicate that it is quite practicable to apply cement stucco in freezing weather. As soon as the first coat has frozen hard, a second can be applied. The mortar is first warmed well and often held until about the point of initial set. The stucco continues to set and harden after thawing out the following spring and, so far as they have been able to observe, is as good as similar stucco applied in warmer weather *Zement* (1935) **23,** No. 49, p. 723.

Residue from Aluminum Chloride Manufacture as a Pozzuolannic Admixture for Portland Cement. In making this chemical, a kaolin is treated with a mixture of chlorine and carbon monoxide at 1000 to 1150 deg. C. and the residue is a white siliceous powder, with about 12% alkali soluble silica. P. P. Budnikoff describes the effect of replacing 10, 20, and 30% of standard portland cement with this material on the strength of the resulting mortar when stored in tap, distilled and mineralized water. The latter contained 488 gram magnesium chloride, 120 gram magnesium sulfate and 87 gram sodium chloride per liter. In the presence of the aggressive salts, especially, the admixture seemed quite helpful, both as to strength and as to visible disintegration. By using a fairly large amount and mixing with a light colored portland cement, a white cement is obtainable. *Zement* (1934) **23,** No. 51, p. 749.

Compound Flame Furnace for the Burning of Cement. The advantage of the flame furnace, according to N. C. Kyriacou, lies in the production of maximum heat in shorter time with highest temperatures obtainable in practice, while the disadvantage lies in the large amount of heat carried out by the waste gases. In cement burning the clinkering is done mostly by radiant energy, while for preheating and calcination, actual contact between the solids and the products of combustion is needed. For the former, a high temperature is essential, while for the latter, the opportunity for contact between the solids and the gases and the velocity of the latter are important. For the solution of this problem, Kyriacou has secured patent protection on a cement kiln having a stationary arch lined with high grade refractories. In the clinkering zone, the floor of the furnace is solid with one portion raised at the hottest point to provide adequate clinkering. For the calcining and preheating, the charge rests on a steel grate down through which the waste gases are sucked. Exit temperatures of 120 deg. C. are claimed. The movement of the charge is secured by having the grate as well as the solid part of the bottom mounted on elliptical rollers which are driven by a d.-c. motor to give an irregular oscillating movement. For the solid part of the bottom, a 20-hp. motor is adequate. And the speed of charge travel is regulated readily by varying the motor speed. For the wet process, a supplementary grate may be charged with bodies capable of storing heat, thereby giving a rapid drying and pulverizing of the raw material. *Cement and Cement Manufacture* (1934) **7,** No. 10, p. 309.

The Setting and Hardening of Portland Cement. While the constitution of portland cement clinker has been pretty thoroughly worked out, the more difficult problems in connection with setting and hardening, largely because of their colloidal character, are more obscure. In this connection, the recent granting by the National Research Council to Dr. L. S. Brown of $1000 for the study of gel structures in cement is of interest.

K. Koyanagi of Tokio has been trying to find what role crystallization reactions might have in setting and hardening with the usual water content. When excess water is added, crystals have often been obtained and the questions arise as to the effect of reducing the water content, upon the form of the crystals. The high lime concentration, even to supersaturation, in the liquid phase of freshly mixed mortars, is probably the chief factor in controlling any crystal formation. The following crystals had been observed:

(1) Six sides plates of $3CaO.Al_2O_3.10.5 H_2O$.

(2) Needle or prisms of $3CaO.Al_2O_3 3CaSO_4.32.6 H_2O$.

(3) Large hexagonal plates of $Ca(OH)_2$.

The first two may become quite sizable in low lime concentrations, but decrease in size and appear to be gels under the microscope in saturated lime solutions. The solubility of these two compounds is very low in strong lime solutions, so they are precipitated rapidly and are very fine. Polarized light, however, indicates their presence as crystals of colloidal size. Lime crystallizes out regardless of the amount of water added.

By placing the fraction separated in an alcohol sedimentation apparatus, and lying below 10 microns, on a slide with 40% water and covering immediately with a cover glass so as to exclude carbon dioxide, Koyanagi observed with polarized light the gradual disappearance of the initially visible crystals, leaving after a time a clear field. In five or six hours, points again became visible, growing in 12 hours to a size permitting identification as crystals. These were hexagonal or prismatic and by the third day had increased in size and number until they had filled the whole field.

With high early strength cements, the crystals appeared much sooner, were much smaller and more numerous. The addition of calcium chloride to the mixing water had a similar effect. With a trace of sugar, the usual formation of lime crystals did not occur, and only on the 14th day did a few long slender crystals develop. As a result of these observations, Koyanagi is of the opinion that the crystallizing lime has a very important role to play in the hardening of cement, and the much held conclusion that, "the hardening of portland cement is a purely colloidal phenomenon," is not altogether true. *Zement* (1934) **23,** No. 48, p. 705.

Weathering and Behavior of Stones. A book by Rathgen and Koch records observations on the protection of stones, especially monuments, against weathering. This subject aroused considerable interest in Germany and committees were appointed as early as 1907 to study this subject. The results of the exhaustive study of the weathering of the Marienkirche in Gelnhausen, and of several other studies, are given, including numerous results on the content of sulfurous and sulfuric acids in the air of many localities. A great deal of attention is given to protective treatments, concerning which the conclusion is reached that when properly applied a protective treatment is not only valuable but is actually indispensable. Only with assistance of adequate protective treatment can one expect to be able to preserve monuments. *und Beton,* G.m.b.H., Berlin NW 21, Rm. 9.5.

Counteracting the Cracking of Concrete Pavements. It is suggested by Viere Severi, of Florence, to place a base about 6 in. thick of bituminized-cement concrete and cover with 2 in. of highest strength concrete obtainable. In the base, of course, only such reinforcement is added as is required for structural strength, while the wear coat should be reinforced to control the shrinkage tendency of such rich concrete. For this purpose, Severi would like to use a cast iron cellular reinforcement. *Tonindustrie Zeitung* (1934), **58,** No. 91, p. 1109.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Lime Solubility

A PROBLEM, study of which is somewhat neglected, is that of lime solubility, that is, the degree that lime will disperse in water to form first putty, then on further dilution lime water. Evidently if lime is to be useful it must lend itself to use. The fact that there is calcium oxide in a lump in many cases means little because often this calcium oxide refuses to break up. It remains as a gritty residue of rather varied degree of coarseness. The chemist by his method of analysis will determine that there is 90% CaO, still the solubility may be found to be only 60%, fully 40% remaining over.

To some this appears puzzling: Is not CaO always the same? Should it not act always the same? Break up, disseminate and enter the solution? Unfortunately it does not do this. There are many complications possible and they may be caused by diametrically opposite causes, but by the same main underlying reason. Poor solubility, for example, may be caused by overburning. Then again it may be caused by underburning, and with this chemistry has very little to do. It is entirely a question of physical arrangement.

All lime in any form consists of infinitely small sub-microscopic cells. In case of limestone, Fig. A, they are closely packed. The edges of one are under atomic influence of its neighbor. Specific gravity is quite constant, the difference very little between the heaviest and lightest stone, and neither heavy pressure nor heat can change this density to any great extent.

During the calcining process the internal arrangement changes. If lime is soft burned the outside dimension of the lump will still be about the same as it was as limestone; internally invisible and startling changes have however taken place. The original cells which previously contained two molecules now contain four, and over and above this, the packing of atoms in the cells is so dense that each cell is smaller by a considerable amount and much heavier. All of this can, of course, mean only one thing, that empty spaces are created between the cells as shown by Fig. B.

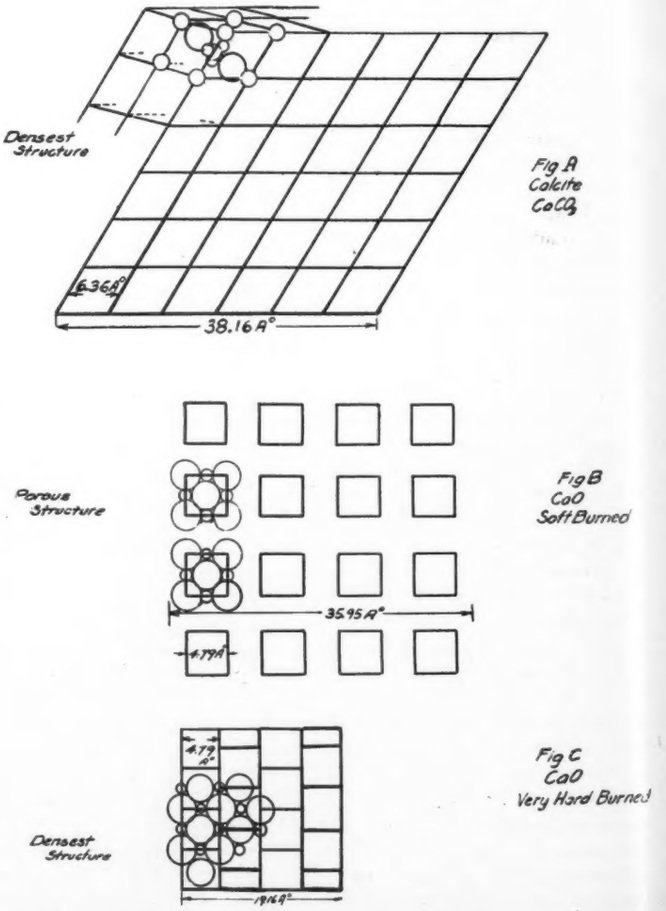
Higher and lower burning temperatures as well as time of burning have quite an effect on lime, outside entirely of the combinations that may take place with impurities at higher temperatures. If lime is soft burned, there will be little shrinkage of the lump and the specific gravity will be only 1.7; since we know, however, that calcium oxide has a specific gravity of 3.4, evidently empty spaces not under atomic influence of the cell must have occurred somewhat as shown in Fig. C. It is through these spaces, when unobstructed, that water molecules enter to combine with calcium oxide and to form calcium hydrate.

If limestone is burned at a very high temperature, it will shrink so that cells will practically touch. This is shown by Fig. C. The specific gravity now will be, instead of 1.7, as high as 3.4, and all the spaces will be eliminated. The lime will be dead burned, quite inactive, very slowly hydrating, the settling rate will be very fast, the percentage of residue will be high; and the reason for all this is the elimination of the spaces, which prevents access of water. There was no change in the lime cells themselves; they are as perfect as they are when lime is soft burned, but they are occluded, surrounded by a wall, so to speak.

Fortunately the intracellular spaces are considerably larger than the water molecules, so there can be a great deal of shrinkage without seriously affecting the action of the lime. Still, however, as kilns are often operated, considerable damage is done either by too high temperatures, or partly by keeping the lime in the kiln for too long periods after it is burned.

While elimination of spaces quite clearly explains the behavior of hard burned lime, why should soft burned lime behave the same? Certainly since there was no shrinkage the spaces should exist and water should be able to enter and combine with the oxide to form hydrate, and this hydrate, being very much bulkier, should break up and disintegrate the lump. Unfortunately, limestone does not all burn at the same temperatures. At the surface, yes; but internally often the CO_2 generated is occluded and cannot escape except it builds up pressure, and under this higher pressure the decomposition temperature is higher. So one may well say that certain crystals may burn much faster than others.

If a piece of lime is heated just enough to make it appear that it is completely calcined without any visible indication of core, this lime may still contain some carbon dioxide; that is, certain crystals of limestone are still present unburned. The amount of $CaCO_3$ present may be comparatively small, say 3%, still the carbonate represented by this CO_2 is bulky and often so located that it closes off the passages through which wa-



Diagrams showing the changes that take place in atomic structure when burning limestone into lime under various conditions in the kiln.

ter enters into the lump of lime, and as a result somewhat the same thing occurs as when the lime was overburned. The comparatively small amount of carbonate made a much greater amount of oxide unavailable and so availability was low. This explains why soft burned lime may act the same in some respects as hard burned, and the reason for both is the same.

If lime contains impurities and is burned at too high temperatures or for too long at lower temperatures, a combination takes place between the silica or alumina and lime and a substance is formed somewhat as a glaze, little affected by water. The calcium oxide that entered the combination becomes unavailable, and further this new compound that was formed obstructs the free flow of water into the intracellular space of quick lime and so some portion of uncombined CaO fails to slack in the time it has available.

Then in addition there is the possibility of recarbonization and lime reverting to carbonate, which is an expansion process and may cause the same occluding of unaffected cells of CaO and raise the amount of unavailable lime.

We could well call the CaO that is present but is not available, a CaOx. It is CaO but in many processes it does no good.

Tests made indicate that most CaOx is not formed where lime is hottest on the outside of the lump, but rather where lime is the coolest on the inside close to the core. Tests made of lime adhering to core revealed 29% to be CaOx.

This would seem to indicate strongly that recarbonization is quite a factor—not, however, recarbonization process as ordinarly accepted, that caused by percolation of gases from outside in. If that was the case the outer layers of lime would be recarbonated more than the inner layers, but the reverse seems to be true.

It so appears that recarbonization can take place for two different reasons; in one case CO_2 may pass into the lump from passing gases; when the temperature of the lime is right the CO_2 will be taken on with great avidity. But conditions favorable to this are not so very common.

The second and far more common case is that the outer layers of a lump may become cooled when the inner layers are still hot and still giving off CO_2. All such CO_2 will then be absorbed while attempting to pass out through the pores among the CaO cells.

As calcium oxide is far more dense than calcium carbonate and occupies less true space, on recarbonization expansion of particles takes place, and thus not only recarbonated particles in themselves are lost, but also the CaO particles that become occluded by the surrounding growth.

From all of this it appears that any lime containing core will be in part recarbonated. The slower this lime is cooled, the more it will recarbonate. There is only one way to completely avoid this: lime must be completely burned before cooling of outer layer begins and, if core is present, it may be in part avoided by cooling the lime as rapidly as possible to reduce the time element.

Controlled experiments with recarbonization of lime specimens in small lump form further demonstrate this matter of occlusion. Recarbonization at first is most energetic, then it slows up and cannot be carried on to completion. The reason is isolation of CaO by the surrounding growth of $CaCO_3$ and prevention of access to CO_2, the same as under other circumstances H_2O is prevented from penetrating to convert the CaO to $Ca(OH)_2$.

Thus we have the problem of not only producing the CaO in kilns, but also preventing it from reverting, which is far more common than is generally assumed. It all means again that almost all combustion air should pass through the cooler, and lime *must* be drawn cold, as lime drawn hot with core means not only poorer kiln efficiency, but poorer lime as well.

LIME INDUSTRY'S CONVENTION

WEEK of June 15, at Hot Springs, Va., has been announced as the time and place of the annual convention of the National Lime Association. It is expected that by this time Congress will have done something toward a renewal or replacement of NIRA, which otherwise expires June 16.

Illinois Conference on State's Mineral Industries

ON Friday and Saturday, May 17 and 18, there will be a conference of leaders in the mineral industries in the state of Illinois at Urbana. Among the coöperating organizations are State Department of Mines and Minerals; Illinois Mineral Industries Committee; Illinois Coal Operators Association; Illinois Coal Bureau; Committee of Ten—Coal and Heating Industries; Central Illinois Coal Association; Coal Producers Association of Illinois; Illinois Clay Manufacturing Association; Bureau of Materials, State Division of Highways; Mid-West Agricultural Limestone Institute; Illinois Mining Institute; Chicago and St. Louis Sections of the American Institute of Mining and Metallurgical Engineers; Western Society of Engineers; Illinois Chamber of Commerce; Southern Illinois Reciprocal Trade Association.

On Friday, May 17, at 1:30 p. m. there will be a general session on trends in the utilization of mineral products. A paper on the rock and rock products industries will be read by Nathan C. Rockwood, president and editor of Rock Products. Then there will be a discussion of the various subjects by specialists from the University of Illinois and the State Geological Survey.

On Saturday, May 18, at 9:00 a. m., there will be three separate symposia held concurrently; one on coal; one on clay and clay products and one on rock and rock products.

Session on Rock Products

W. R. Sanborn, vice-president, Lehigh Stone Co., Kankakee, president of the Mid-West Agricultural Limestone Institute, will preside. The program will be as follows:

9:00 The Building Stone Possibilities of Illinois Limestones. J. E. Lamar, geologist and head, Non-Fuels Division, Illinois State Geological Survey.

9:20 Factors in the Development of a Rock Wool Industry. C. F. Fryling, associate chemist, Illinois State Geological Survey.

9:40 *Discussion.*

9:50 Flotation and Concentrating Tables as Means for Improving Crushed Stone, Sand and Gravel.

10:20 *Discussion.*

10:30 The Significance of Accelerated Weathering Tests on Stone and Gravel. A. T. Goldbeck, director of the Bureau of Engineering, National Crushed Stone Association, Washington, D. C.

11:00 *Discussion.*

11:15 Progress Report on the Study of the Utilization of Novaculite. C. W. Parmelee, head, Department of Ceramic Engineering, University of Illinois.

11:30 Trends in the Development of Different Grades of Portland Cement.

12:00 *Discussion.*

12:10 Trends in the Manufacture and Utilization of Lime. Lee S. Trainor, National Lime Association, Washington, D. C.

12:40 *Discussion.*

All producers of rock products in Illinois or adjoining states will be welcome.

The conference is in charge of M. M. Leighton, chief, Illinois State Geological Survey, and those attending will be given an opportunity to visit the laboratories of the Survey and the State University. There will be an informal dinner on Thursday night at 7 p. m., at which Dr. John W. Finch, director, U. S. Bureau of Mines, is expected to be the principal speaker.

Cement

Edison Cement Corp., West Orange, N. J., is said to be considering development of its limestone property at Catskill, N. Y., with a view to furnishing raw material to its subsidiary, the Metropolitan Cement Corp., New Brunswick, N. J. The latter company's plant is largely that built during the war to make potash from New Jersey green sands. A large lime plant with rotary kilns is being converted to manufacture portland cement.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of April 20:

New England

35391. To cancel Item 615 of Me. C. R. R. I. C. C. C–4463, **fluxing stone,** and establish in lieu thereof the following rates on **broken or crushed limestone,** in bulk in open top cars (see Note 3), but not less than 80,000 lb.: from Rockland and Thomaston, Me., to Amesbury, Mass., $2.05; Beverly, Mass., $2.05; Biddeford, Me.. $1.70; Boston, Mass., $2.15; Lynn, Mass., $2.15; Machine Shop, Mass., $2.05, being rate per ton of 2000 lb.

35532. **Amiesite or stone,** coated with oil, tar or asphalt, in bulk, in gondola or other open top cars, C. L. (See Note 3), from Kendall Green and Winchester, Mass., to Worcester, Mass. Present, $1 per net ton; proposed, 80c per net ton. Also change the minimum weight in connection with commodity rate of 70c per ton of 2000 lb. on **crushed or broken stone,** C. L., published in B. & M. R. R. M. D. P. U. 2411, from Winchester and Kendall Green, Mass., to Worcester, Mass., to read as in Note 3.

Trunk

33406. **Crushed stone,** C. L., (See Note 2), from Ormrod, Penn. (Ironton R. R.), to York Farm Jct., Penn., 90c per net ton. Present rate, $1.15 per net ton.

33408. **Crushed stone,** C. L., (See Note 2), from Bethlehem, Penn., to Cologne, N. J., $1.40 per net ton.

33415. **Sand, glass,** other than pulverized, C. L., (See Note 2), **sand, glass,** pulverized or ground flint, C. L., minimum weight 40,–000 lb., from Gore and Triplett, Va., to Hopewell, Va., $3.20 per net ton.

33416. **Sand** (other than blast, engine, foundry, glass, moulding or silica) and **gravel,** C. L., (See Note 2), from Buffalo, N. Y., to International Ry. stations, Wrights, N. Y., to Olcott, N. Y., $1 per net ton.

33417. To amend commodity description in connection with rates on **sand** and **gravel** from Farmingdale and South Lakewood, N. J., to various C. R. R. of N. J. destinations in C. R. R. of N. J. tariffs 1589, 1597, 1772, 2154, 2182; I. C. C. G–3883, Item 430–B to read: Building sand and gravel, in open top equipment, C. L.

33420. **Group A—Stone, broken or crushed,** in carloads. Group B **stone, crushed,** coated with oil, tar or asphaltum up to 10%, in carloads, (See Note 2), from Schoharie, N. Y., to stations on the Catskill Mountain branch of the N. Y. C. R. R., Group A rates ranging from $1.25 to $1.75 per net ton. Group B rates ranging from $1.35 to $1.85 per net ton.

33421. **Sand** (other than sand processed beyond washing or screening for decolorizing, filtering or water softening) and/or **gravel,** in open top equipment, C. L., (See Note 2), from Hopatcong Junction, N. J., to stations on the P. R. R. Woodbridge, Martins Creek, N. J., Lancaster, Pottstown, Temple, Tuscarora, Frackville, Chester, Penn., Wilmington, Del., Herndon, Mt. Carmel, Lebanon, Penn., rates ranging from $1.10 to $2 per net ton.

33431. To cancel in full Note 3, Section 2 of B. & O. R. R. I. C. C. 22665, publishing rates on **limestone,** unburnt ground or pulverized, carloads, minimum weight 50,000 lb., and on **ground marl,** C. L., from B. & O. R. R. producing points to destinations in New England.

33438. Cancel commodity rates on **crushed stone,** C. L., from Ormrod, Penn., on the Ironton R. R. to stations on the Bangor & Portland division of the D. L. & W. R. R., class rates to apply.

33450. **Broken stone** as shown in Item 10 of I. C. C. 1387, from Port Deposit, Md., to Longport, N. J., $1.60 per net ton.

33466. **Sand,** building, glass, engine, moulding, ground flint, quartz and silex, in straight or mixed carloads, (See Note 2), from Mapleton District, Penn., to Albany, N. Y., $3.10 per net ton.

Sup. 1 to 33466. **Sand, building, glass, engine, moulding, ground flint, quartz and silex,** in straight or mixed carloads (See Note 2), from Hancock-Berkeley Springs, W. Va., District and Gore-Triplett, Va., to Albany, N. Y., $3.10 per net ton.

33469. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk in open top equipment, C. L., (See Note 2), from Bethlehem, Penn., to stations on the D. L. & W. R. R., Jersey City, Newark, Wharton, Franklin, Hacketts–town, New Village, Stewartsville, Wind Gap, Bath, Lehigh, Scranton, N. J., Bloomsburg, Northumberland (Northumberland Co.), Penn., Binghamton, Oswego, Itaska, Norwich (Chenango Co.), N. Y., and various, rates ranging from 93c to $1.81 per net ton.

33476. **Sand and gravel,** N. O. I. B. N., C. L., (See Note 2), from Cuddebackville, N. Y., to Pond Eddy, Penn., 90c, Shohola, Penn., $1, and Lackawaxen, Penn., $1 per net ton.

33482. **Stone,** crushed, coated with oil, tar or asphaltum, C. L. (See Note 2), from Erie, Penn., to Allegheny, Brainard, Buffalo, N. Y., Emporium, Johnsonburg, Penn., Nunda, Salamanca, Sherman, N. Y., Thornton Jct., Clarion, Penn., and various, rates ranging from 73c to $1.64 per net ton.

33484. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to Erie R. R. stations Jersey City Local, Passaic, N. J., Tallmans, Arden, Newburgh, Port Jervis, N. Y., Lackawaxen, Scranton, Penn., Stockport, N. Y., Great Bend, Penn., Binghamton, Oswego, Elmira, N. Y., Edgewater, Franklin, N. J., Stroudsburg, Clifton, Dickson, Penn., Hackensack, N. J., Spring Valley, N. Y., Ridgefield, N. J., Nyack, N. Y., and various, rates ranging from $1.33 to $1.81 per net ton.

33485. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to L. & H. R. R. Ry. points Maybrook, Warwick, Monroe, Huntsville, Alphane, Buttzville, N. Y., and various, rates ranging from $1.13 to $1.43 per net ton.

33486. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to stations on the N. Y. C. R. R. and W. S. R. R., Blackwell, Tombs, Newberry Junction, Mill Hall, Kato, Penn., Hoboken, Haverstraw, Cornwall, Kingston, N. J., Alsen, Albany, N. Y., Fullers, N. Y., and various, rates ranging from $1.43 to $1.81 per net ton.

33492. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to Raritan River R. R. stations, McDonough's, Phoenix, Parlin, Wright's, Amclay, New Brunswick, N. J., and various, $1.43 per net ton.

33493. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to S. & N. Y. R. R. stations, Towanda, Weston, Cold Spring, Rockdale, Crandalltown, Ralston, Penn., etc., $1.81 per net ton.

33500. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to B. & O. R. R. stations, Darby, Penn., Wilmington, Newark, Del., Clayton, Bradshaw, Sparrows Point, Baltimore, Relay, Laurel, Md., Uniontown, Washington, D. C., Ellicott City, Mount Airy, Md., Hancock, W. Va., and various, rates ranging from $1.33 to $1.81 per net ton.

33501. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to Pennsylvania Railroad stations, rates ranging from 93c to $1.81 per net ton.

33503. **Stone,** crushed, coated with tar, oil and/or asphaltum, or similar bituminous material, in bulk, in open top equipment, C. L. (See Note 2), from Bethlehem, Penn., to stations on the Reading Co., P. R. S. L., Cornwall Railroad, Stone Harbor Railroad, Wildwood & Delaware Bay Short Line R. R., Trenton-Princeton Transit Co., and Q. & B. R. R., rates ranging from 93c to $1.63 per net ton.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Central

42525. To cancel rates on (A) **sand,** blast, core, engine, filter, fire or furnace, foundry glass, grinding or polishing, loam, moulding, and silica, and (b) sand, except as provided under Description "A" above, and **gravel,** in P. R. R. Tariff 117–B and P. R. R. Tariff 118–B.

42561. To establish on **sand,** viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, C. L., from W. & L. E. Ry. stations taking Canton group rate in W. & L. E. Tariff I. C. C. 1560, viz., Barr, Beach City, Dundee, Massillon, New Cumberland, Kent Sand and Gravel Pit and Somerdale, O., to Walford, Penn., $1.26 per net ton.

42578. To establish on **sand** (except ground, pulverized and naturally bonded molding sand), in closed cars, C. L., from Franks Siding, Mich., to Port Huron, Mich., 120c, and to Sarnia, Ont., 190c per net ton.

42615. To establish on **stone,** crushed (in bulk), and **crushed stone screenings** (in bulk), in open top cars, C. L., from East Liberty, O., to Santa Fe, Gutman, Slater, O., 60c per net ton.

42619. To establish on **limestone,** ground or pulverized, in bags, in box cars, C. L., minimum weight 60,000 lb., Greencastle, Ind., to Wharton, Ind., 155c per net ton. Route—Via P. R. R., South Bend, Ind., N. J. I. & I. R. R.

42620. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), or **gravel,** in open top cars, C. L., Conesville, O., to Cambridge, 85c, and to Mohawk, O., 70c per net ton.

42621. To establish on **stone dust,** C. L., Marble Cliff, O., to Fort Wayne, Ind., 140c per net ton. Route—Via P. R. R. direct.

42622. To establish on **stone, fluxing, furnace or foundry, melting** and/or **refractory** (unburned), in bulk in open top cars, C. L., from Marble Cliff, O., to Huntington, W. Va., 146c per gross ton. Route—Via P. R. R., Columbus, O., C. & O. Ry.

42625. To establish on **stone,** crushed, coated with oil, tar or asphaltum up to 10%, in bulk in open top equipment, C. L., from Erie, Penn., to points in Ohio, New York and Pennsylvania, rates illustrations of which are shown below.

To	Proposed
Conneaut, O.	83
Painesville, O.	103
Youngstown, O.	112
Sharon, Penn.	123
Jamestown, Penn.	103
Reidsburg, Penn.	133
Ripley, N. Y.	83
Dunkirk, N. Y.	93
Falconer, N. Y.	103
Clarion, Penn.	155
Jamestown, N. Y.	118
Wharton, Penn.	177

42626. To establish on **sand,** viz., blast, core, engine, filter fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, C. L., from Zanesville, O., group, i. e., Bremen, Glass Rock, Glenford, New Lexington, Rushville, South Zanesville, Thornville, Yost and Zanesville, O., to Mineral, Anawan, Atkinson, East Moline, Moline and Rock Island, Ill., 365c per net ton.

42627. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel**, C. L., from Lorain, O., to Macedonia, O., 80c per net ton. Route—Via N. Y. C. & St. L. R. R., Cleveland, O., P. R. R.

42628. To establish on **crushed stone**, in open top cars, C. L., **sand** (other than blast, engine, core, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel**, in open top cars, C. L., from Sandusky, O., to Rice Spur, 80c per net ton.

42654. To establish on **stone**, crushed, coated with oil, tar or asphaltum, C. L., from Erie to points in Pennsylvania and New York, rates, representative of which are as follows (rates in cents per net ton):

To	Rates
Allegheny, N. Y.	133
Brent, Penn.	123
Buffalo, N. Y.	133
Dents Run, Penn.	161
Farrell, Penn.	103
Grove, Penn.	153
Keating, Penn.	161
Mercer, Penn.	123
Nunda, N. Y.	161
Port Allegany, Penn.	153
Salamanca, N. Y.	128
Schenley, N. Y.	143
Sligo, Penn.	143
Stoneboro, Penn.	133
Clarion, Penn.	164

42655. To establish on (A) **crushed stone**, in bulk, in open top cars, and (B) **limestone**, agricultural, not ground or pulverized, or limestone, agricultural, unburned, in bulk in open top cars, C. L., (See Note 3), from Chicago and Joliet, Ill., to Neeleys, Doster and Hooper, Mich.

(A) 140c, and (B) 161c per net ton.

42676. To establish on **limestone**, ground or pulverized, **agricultural limestone** and **limestone screenings**, in box cars, in bulk or in packages, C. L., minimum weight 50,000 lb., from Ridgeville, Ind., to points in Indiana. Representative proposed rates:

To	Proposed
Bluffton, Ind.	125
Crown Point, Ind.	195
Goshen, Ind.	175
Indianapolis, Ind.	150
Lebanon, Ind.	155
Muncie, Ind.	105
Plymouth, Ind.	180
Steubenville, Ind.	195
Waterloo, Ind.	145
Zadoc, Ind.	190

42671. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), or **gravel**, in open top cars, C. L., (See Note 3), from Navarro, O., to Senecaville, O., 100c per net ton.

42688. To establish on **stone**, crushed, C. L., from Keeport, Ind., to Lafayette, Ind., 70c per net ton. Route—Via Wab. Ry. direct.

42691. To cancel rates on **sand**, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, C. L., from Allison Branch, Ill., to points in Indiana and Ohio, published in B. & O. R. R. Tariff E-3485-A.

42699. To establish on **stone, fluxing, furnace or foundry**, melting and/or refractory (unburned), in bulk, in open top cars, carload, from Carey and McVittys, O., to Lansing, Mich., 212c per gross ton.

42758. To establish on **crushed stone, crushed stone screenings and agricultural limestone** (not ground or pulverized), in bulk in open top cars, C. L., from Bluffton, Ind., to points in Michigan, rates as illustrated below, in cents per net ton, being representative:

(N. Y. C. R. R.) To	Prop.	To	Prop.
Montgomery	105	Wasepi	110
Bankers	110	Vicksburg	112
Hanover	112	Kalamazoo	117
Cement City	117	Plainwell	122
Saline	122	Moline	127
Ypsilanti	127	Grand Rapids	130
Hudson	112	(M. C. R. R.)	
Lansing	127	Ann Arbor	135
Springport	117	Snyders	130
Litchfield	112	Tekonsha	125
(P. R. R.)		Union City	120
Sturgis	105	Centerville	115
		Three Rivers	120

42760. To establish on **crushed stone**, in open top cars, C. L., from Melvin, O., to Harrison, O., 100c per net ton.

42783. To establish on **sand**, blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica, C. L., from Polk, Penn., to Detroit, Mich., 215c in open top cars and 220c per net ton in closed equipment.

Southern

7461. Amdt. 1. **Stone, viz., calcite,** ground, C. L., from Cartersville, Ga., to Montreal, Que., New Toronto and Toronto, Ont. It is proposed to continue in effect existing rates, subject to specific routing and Rule 27.

7897. **Stone,** crushed, C. L. (see Note 3), from Williston, Fla., to Port Wentworth, Ga., 150c per net ton.

7916. **Sand, gravel, crushed stone, etc.,** C. L., from interior Florida points located on the S. A. L. Ry., Jacksonville, Gainesville & Gulf Ry. and Tavares & Gulf R. R. to points in Georgia as published in Section 2, pages 36 and 37 of S. F. T. B. I. C. C. No. 1540, Florida sand and gravel tariff, by eliminating the Florida peninsula arbitraries specified in paragraph 5, page 36, of this tariff.

7926. **Ground or pulverized limestone,** C. L., minimum weight 60,000 lb., from **Dugan, Ky.**, to Columbus, O., proposed 300c per net ton.

7990. To extend expiration date rates on **phosphate rock** and **phosphatic limestone,** C. L., from L. & N. R. R. and N. C. & St. L. Ry. stations in the Mt. Pleasant-Centreville district (named in L. & N. R. R. G. F. O. 44-D, I. C. C. A-16079) to Chicago, Chicago Heights, Ill., Detroit, Mich., Toledo, Sandusky, Cleveland, Ohio, and intermediate points on the direct routes to December 31, 1935.

7990 (Amdt. 1). **Phosphate rock and phosphatic limestone.** Extension of expiration date. Submittal 7990, included in Docket 778, assigned for hearing April 15, 1935, was amended to include Joliet, Ill., as a destination to which the expiration date will be extended to December 31, 1935, unless sooner canceled, changed or extended.

8059. It is proposed to establish a rate of 140c per ton of 2000 lb. on **sand and gravel,** C. L., (See Note 3), from Carrollton, Ky., to Mt. Sterling, Ky. (intrastate).

8076. **Limestone,** ground, C. L., Buchanan, Va., to Dunn, N. C. It is proposed to establish rate of 170c per net ton, C. L., minimum weight 60,000 lb. Same as rate approved under Submittal 3435 from Rocky Point, Va., to the same point.

8077. To establish rates on **phosphate rock,** not acidulated (acid phosphate), nor ammoniated, and **limestone, phosphatic,** straight or mixed carloads, minimum weight 40,000 lb., except when the marked capacity of the car is less, in which case the marked capacity of the car will govern, from Mt. Pleasant, Tenn., to specified destinations in Kentucky and Tennessee.

8147. **Stone, crushed,** C. L., Armona, Tenn., to Madisonville, Tenn. (intrastate). It is proposed to establish intrastate rate of 50c per net ton (to expire 90 days from effective date), C. L., minimum weight as per Item 250 of S. F. T. B. Tariff 388-A, I. C. C. 1635, from and to above named points.

Western

D-41-62 (Sup. 2). **Stone,** crushed, ground or pulverized, C. L., (See Note 2), but not less than 40,000 lb., to Colorado common points. (Rates in cents per net ton.)

From	Pres.	Prop.
Alden, Ia.	*Class E	400
St. Louis, Mo.	610	400
E. St. Louis, Ill.	610	400
Valmeyer, Ill.	642	432

*To Denver, Colo., $7.20 per net ton.

D-41-64 (Sup. 1). **Limestone,** crushed or ground, C. L., from Alden, Ia., to Wyoming points shown below. Rates proposed:

To	Min. Wt. 60,000 lb. Cents	Min. Wt. 90% of marked capacity of car. Cents
Van Tassel, Wyo.	28.5	26
Douglas, Wyo.	29	26.5
Casper, Wyo.	30	27.5
Powder River, Wyo.	31	28.5
Riverton, Wyo.	31.5	29
Lander, Wyo.	32	29

D-41-64 (Sup. 2). **Limestone,** crushed or ground, C. L., from Hannibal, White Bear, Mo., and Quincy, Ill., to Wyoming stations shown in the original application (Application Bulletin 3982 of March 8, 1935). Proposed—2½c per 100 lb. in excess of the rates proposed from Louisville and Weeping Water, Neb.

D-41-67. **Chatt sand,** C. L., (See Note 3), thee minimum weight in no case, however, to be less than 40,000 lb., from Atlas, Carthage, Granby, Joplin, Oronogo, Porto Rico, Prosperity, Webb City and Carterville, Mo., to (St. Louis) Group 1. Proposed—Amend Item 3660 of W. T. L. Tariff No. 18-N by adding Group 1 (St. Louis) in the destination column at rate of 12c per 100 lb.

D-41-68. **Sand,** molding, (See Note 3), from Boulder, Louisville and Lafayette, Colo., to Topeka, Kan., Kansas City, Mo., Omaha, Neb., and Des Moines, Ia. Proposed—25c per 100 lb.

E-41-69. **Crushed stone** and/or **crushed marble,** minimum weight 100,000 lb., from Canon City, Colo., and all Colorado common points; Pueblo, Colo., to Denver, Colo., inclusive. To W. T. L. defined territory as follows: Missouri River, St. Louis and Chicago. Proposed—Missouri River, $4 per net ton; St. Louis, $5 per net ton; Chicago, $5.75 per net ton.

D-41-70. **Limestone,** ground, C. L., (See Note 3), minimum weight 54,000 lb., from Alden, Ia., to stations in Kansas, Oklahoma and Texas. Rates proposed—To establish from Alden, Ia., to points in Kansas, Oklahoma and Texas, mileage scale the same as applicable from Hannibal to Carthage, Mo.

E-41-59 (Sup. 2). **Limestone,** crushed or ground, C. L., (See Note 3), from Alden, Ia., to Trinidad, Colo. Proposed—$4.60 per ton of 2000 lb.

Sup. 1 to E-41-59. **Limestone,** crushed or ground, C. L., (See Note 3), from St. Louis, Mo., E. St. Louis and Valmeyer, Ill., to Trinidad, Colo. Proposed—$4.60 per ton of 2000 lb.

E-41-71. **Sand** (river) and **gravel,** C. L. (See Note 3). In no case shall the minimum weight be less than 40,000 lb., from Pacific and Valley Park, Mo., to Alton, Wood River, Federal and Litchfield, Ill. Rates in cents per net ton, carloads:

		River Sand		Gravel	
To Alton, Ill.	Rte.	Pres.	Prop.	Pres.	Prop.
Alton R. R.	1	138	106	106	N.C.
C. C. C. & St. L.	2	140	106	140	106
I. T. Co.	3	128	106	106	N.C.
Federal, Ill.					
Alton R. R.	1	138	106	106	106
I. T. Co.	2	128	106	106	106
Wood River, Ill.					
Alton R. R.	1	123	106	106	106
C. C. C. & St. L.	2	140	106	140	106
I. T. Co.	3	128	106	106	106
Litchfield, Ill.					
C. C. C. & St. L.	2	140	118	140	118
I. C.	4	138	118	138	118
I. T. Co.	3	140	118	140	118
Wabash	5	138	118	138	118

Southwestern

5098. It is proposed to establish on **chatt sand,** carloads, minimum weight 100,000 lb., from Picher, Okla., to various Indiana destinations, rates the same as presently applicable from Baxter Springs, Kan., per Item 35, St. L.-S. F. Ry. Tariff 4288-J, I. C. C. 9507. Example: To Bedford, Ind., rate of 353c per net ton.

5223. **Phosphate rock,** within the Southwest and between the Southwest and the Southeast. In order to permit alternative application of the higher rate with the lower minimum or the lower rate with the higher minimum, whichever produces the lower through charge, on phosphate rock from Southeastern mines to Southwestern points, it is proposed to amend Note 2, Section 3, of Item 570-E, S. W. L. Tariff 173-F.

Illinois

7588-B. **Crushed stone,** C. L., (See Note 3), but not less than 40,000 lb. (Rates per net ton.)

From	Pres.	Prop.
Buffalo, Ia., to Whitton, Ill.	$1.51	$1.20
Linwood, Ia., to Proving Ground, Ill.	1.51	1.13
Linwood, Ia., to Blanding, Ill.	...	1.20

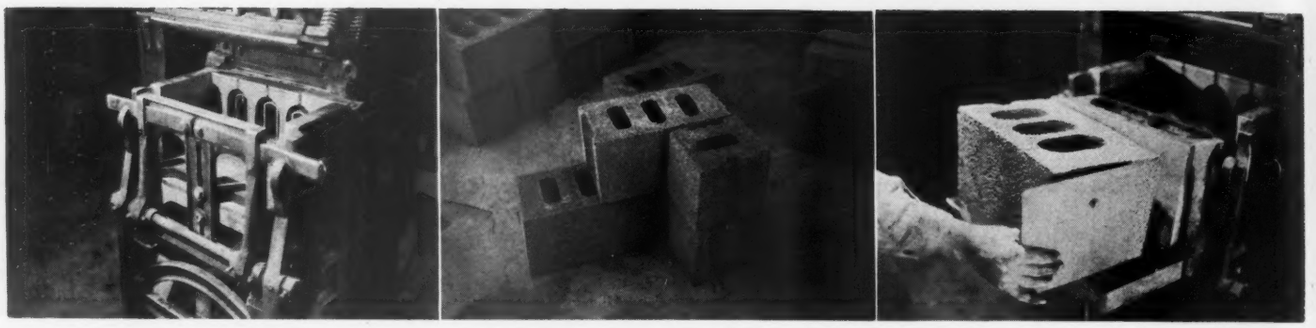
8043-B. **Sand and gravel,** C. L. (See Note 3), but not less than 60,000 lb., from Joliet, Ill., to Camargo, Ill. Proposed, $1.13 net ton.

3665-1. **Gravel,** C. L. (See Note 3), from Elco and Gravel Pit, Ill. (M. & O. R. R.), to M. & O. R. R. stations, Oraville, Ava, Campbell Hill, Willisville, Percy, Moffat Mine, Ewen Mine and Sparta, Ill. Proposed, 80c per net ton.

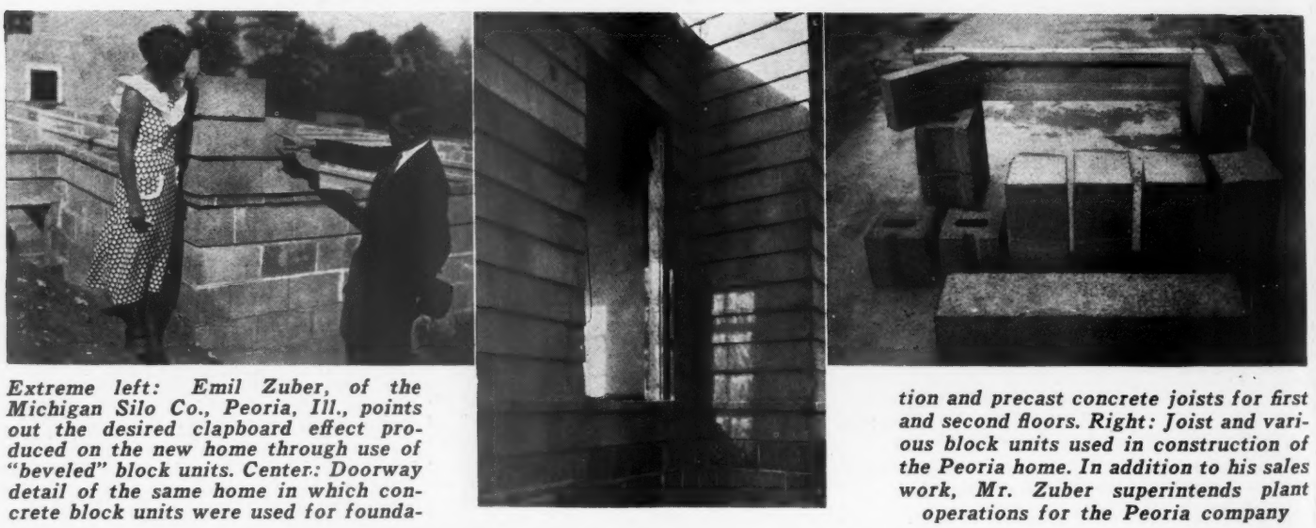
Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

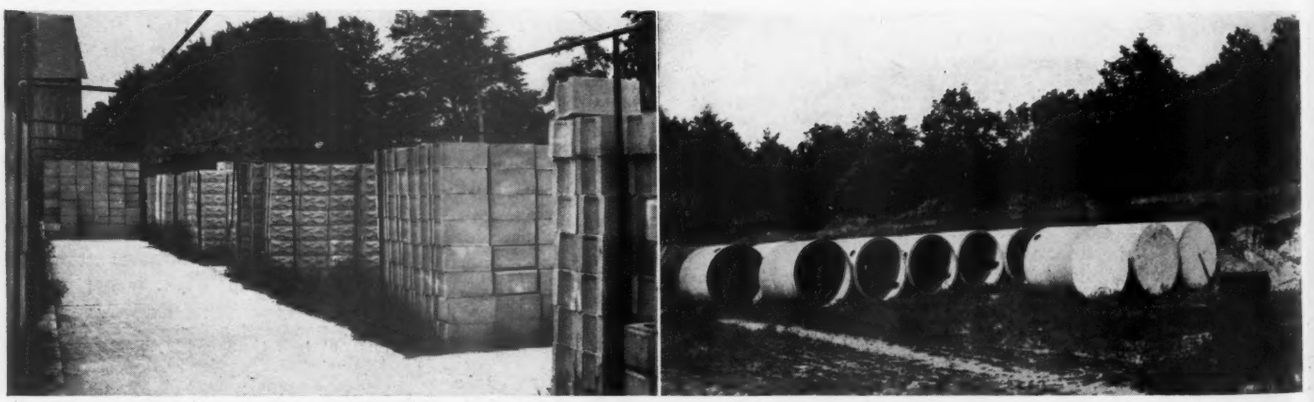
Graphic News of Product, Equipment Trends



Left: Block equipment as modified to produce 8x8⅝x16-in. block (laid up to give an exterior clapboard effect) for residence Peoria, Ill. Center: Inside corner-section detail. Right: "Beveled" block discharged



Extreme left: Emil Zuber, of the Michigan Silo Co., Peoria, Ill., points out the desired clapboard effect produced on the new home through use of "beveled" block units. Center: Doorway detail of the same home in which concrete block units were used for foundation and precast concrete joists for first and second floors. Right: Joist and various block units used in construction of the Peoria home. In addition to his sales work, Mr. Zuber superintends plant operations for the Peoria company



Left: Concrete products storage yard of E. S. Williams, Chelmsford, Mass. Note spray pipe system for water curing. Right: Septic tank units ready for delivery. Sales of these units recently have doubled

Rock Products News Briefs

Cement Products

J. C. Stempfley & Sons, Farmington, Minn., are erecting a new concrete block and brick plant.

◈ ◈ ◈

C. E. Nightingale, Peekskill, N. Y., who has been operating a sand and gravel plant at Annsville, is now building a new plant to manufacture concrete blocks and shapes for small houses, at Peekskill. The following from the *Peekskill Star* is quoted verbatim—and at length—to show how an intelligent products manufacturer can obtain some valuable publicity:

"Mr. Nightingale, who is a Princeton graduate and an engineer by profession, believes that the depression has gone around the corner. The first recovery in the building industry will be the construction of small houses, as this field has been neglected for several years, and there is always a demand for houses that are well designed and properly constructed, he declares.

"The new concrete blocks which Mr. Nightingale will manufacture are a great improvement over the old style concrete blocks. These blocks will be of various sizes so that when they are laid up in a wall it will have the appearance of being constructed of stone ashlar.

"The blocks will be 2, 4, 6 and 8 in. in height and 8, 12 and 16 in. in length and 8 in. thick. This variation in the size of blocks will make a very pleasing exterior and color can be added to the concrete to avoid the natural cold gray color of cement.

"Mr. Nightingale said that he wants to get away from the 'packing box' type of house which has prevailed in the past when concrete blocks have been used in small house construction. His architect is now working on plans for a model house which he expects to build in the vicinity of Peekskill and have completed in the early summer.

"The outer walls will be furred on the inside with 4-in. blocks with an air space between the furring and the outside blocks. This air space will prevent condensation of moisture on the inside of the wall and keep the house warm in winter.

"The floor beams and roof rafters will be of pre-cast concrete. Floors will be of concrete which will be covered with either linoleum or wood flooring. The roof will also be of concrete and will have asbestos shingles.

"The interior partitions will be 4-in. concrete blocks and the plaster will be applied directly to the blocks. In the basement the joints between the blocks will be pointed up so that a very attractive game room can be had.

"The windows will be of steel construction with a baked enamel finish which does not require painting.

"The model house will have six rooms, bath and garage, with the latest equipment for the home. It will be entirely fireproof, decay-proof, damp-proof, vermin-proof, termite-proof, and storm-proof. The cost of maintenance will be practically nil, as the exterior will never require painting.

"When this house is completed it will be entered in the contest now being conducted by the Portland Cement Association for the most attractive and livable new concrete home erected in New York metropolitan area."

◈ ◈ ◈

Marietta Concrete Corp., Marietta, Ohio, is opening a branch plant in Brooklyn, Md., to manufacture concrete silo staves. The new plant will be located on the waterfront, and shipment can be made by boat, rail or truck to all eastern and western shore points. The E. A. Kaestner Co. has for some time been the Eastern representative for this product and will continue to distribute it in this area. Bruce H. Gallup, of Towson, is agricultural engineer of the E. A. Kaestner Co., also its sales representative.

◈ ◈ ◈

Cincinnati Concrete Pipe Co., Cincinnati, Ohio, has taken over the Ohio Valley Concrete Pipe Co., Reading, Ohio. Arthur S. Langenderfer is president and Sherman Johnson, vice-president and treasurer.

◈ ◈ ◈

Cast Stone Institute will hold a general conference of producers and users of cast stone, or concrete ashlar, in coöperation with the National Bureau of Standards in the Chamber of Commerce of the United States building in Washington, D. C., May 17, to consider the adoption of a proposed commercial standard.

◈ ◈ ◈

Austin Concrete Works, Inc., Austin, Tex., is enlarging its facilities to manufacture reinforced concrete pipe.

◈ ◈ ◈

Prices Bid—Contracts Let

Bridgeport, Conn.: Silliman & Godfrey bid $5.49 per cu. yd. on approximately 4500 cu. yd. of 1:3:5 ready-mixed concrete for city paving; Bridgeport Concrete Co. bid $5.88; Leverty & Hurly, $5.90. On 250 cu. yd. of 1:2:4 mix the Bridgeport Concrete Co. bid $6.25; Silliman and Godfrey $6.29; Leverty & Hurly, $6.70.

◈ ◈ ◈

Cambridge, Ohio: Sixteen identical bids for the furnishing of 289,300 bbl. of low-heat and standard portland cement to be used in the construction of a number of dams in the Muskingum Watershed Conservancy district were opened April 11 by U. S. Army Engineers. The bids submitted showed an approximate cost of $635,000. The proposals revealed a price of $2.19 per bbl for railway relocation work in Dover, and on Mohicanville, Dover and Bolivar dams; $2.21 per bbl. for the dams at Piedmont, Leesville, Atwood and Pleasant Hill. The bidding companies were: Pittsburgh Plate Glass Co., Columbia Cement division; Peerless, Huron, Bessemer, Superior, Diamond, Standard, Green Bag, Lehigh, Universal-Atlas, Southwest, Consolidated, Wabash, West Penn, Alpha and Medusa.

◈ ◈ ◈

New Washington, Ohio: Contract for village's supply of crushed stone for the year let to New Washington Ice and Fuel Co. at $1.54 per cu. yd., delivered on the street.

◈ ◈ ◈

Zanesville, Ohio: Contracts let for city supply of sand and gravel for street repairs to Muskingum River Gravel Co., Zanesville, at 90c per ton, and to Pittsburgh Plate Glass Co., Columbia Cement Division, East Fultonham, Ohio, for crushed stone at 90c per ton, f. o. b. plants.

◈ ◈ ◈

Minneapolis, Minn.: Bids for 15,000 tons of aggregates for street improvements were $1.53 for crushed trap rock by the Trap Rock Co., Dresser Jc., Wis.; $1.35 for crushed gravel produced locally; 20,000 tons of asphalt sand, 45c; 20,000 tons of concrete sand, 45c; 20,000 tons of coarse sand, $1.10. The sand and gravel bids of the various local companies were the same, with a percentage allotted to each.

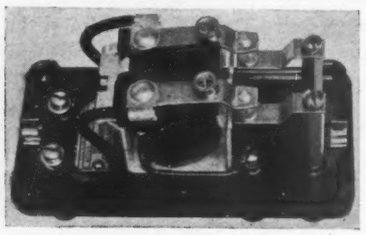
◈ ◈ ◈

Syracuse, N. Y.: Onondago county let a contract for 2000 bbl. of portland cement to Alpha Portland Cement Co., Janesville, N. Y., at $2.39, with 10c per bbl. cash discount. Lone Star (New York) and Lone Star (Pennsylvania), Lawrence, Glens Falls, and Lehigh made the same bid. Three dealers bid $2.54 per bbl.

◈ ◈ ◈

Champaign, Ill.: Champaign County received seven bids of $2.40 per bbl. at Bondville and $2.36 at Mayview or Bongart on 14,800 bbl. of portland cement. For cement in bulk the price was 45c less. The business went 8000 bbl. to Universal-Atlas, 4000 to Marquette, 2800 to Lone Star (Indiana). Lehigh, Missouri, Medusa and Alpha also bid.

New Machinery and Equipment



New Auxiliary Relay

Auxiliary Relay

A NEW AUXILIARY RELAY for use on a.-c. or d.-c., and suitable for switchboard or panel mounting was recently announced by Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. This SK relay is obtainable for circuits up to 550 volts a.-c. or 440 d.-c., and ranges up to 250 volts can be used for intermittent duty up to approximately three times their continuous value. The relay is adapted for any thickness of panel material from ⅛-in. (steel) to 2-in. (slate).

New Large Capacity Trail Cars

A NEW LINE of trail cars in 8- to 25-ton sizes, for use in the handling of rock, ore, coal or other materials of heavy weight and bulk, has been announced by the Austin-Western Road Machinery Co., Aurora, Ill. These cars are on rubber tires and are equipped with bottom or side dump doors, operated by air, hydraulic or mechanical controls. They come in three standard body designs, including special, built-to-order constructions.

It is claimed that these trail cars will haul more than double the load that a truck tractor can carry on its own chassis. Other features include a full universal, gravity-cushioned fifth wheel, generous ground clearance, low overall height, short turning radius, powerful semi-elliptic springs and automatic safety dumping devices, according to the manufacturer. Trailers of this size are being used on government hydro-electric and irrigation projects.

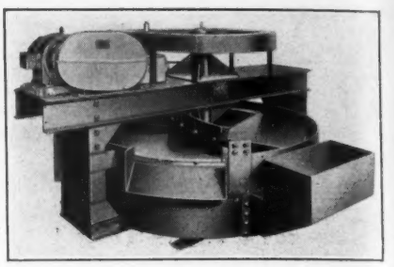
Trail car

Sand Dewatering Device

LINK-BELT CO., Chicago, Ill., announces the "Rotoscoop," which consists essentially of a large circular steel tank or container into which the water and the materials to be treated are introduced; a slow-moving, power-driven suspended rotating disc to the under side of which are attached adjustable renewable scoops for moving the material within the tank; a curved steel adjustable renewable plow mounted in a stationary position above the rotating disc, for plowing off and discharging the dewatered product ready for use; and the necessary driving machinery mounted above the tank on the same steel supports from which the rotating disc is suspended. The machine is made in four sizes: 15-ft., 12-ft., 9-ft. and 6-ft. diameters, with capacities ranging from 20 to 150 tons an hour, based on material weighing 100 lb. per cu. ft.

Because the tank is comparatively shallow and as the material feed box and point of discharge are at approximately the same elevation, the complete machine requires only minimum head room. The driving machinery consists of an electric motor, an encased automatic-lubricating silent chain drive, an enclosed worm-gear reducer, and a pair of spur gears with steel guards, all compactly arranged and mounted on a substantial steel beam over and from the steel tank, thus making the entire Rotoscoop a self-contained unit requiring minimum space and foundations or supporting structure.

The action of the Rotoscoop differs from that of other dewatering machines on the market. Instead of dragging the material up an incline and depending upon gravity and a time period to drain the product, the rotating scoops force the material above the water, through openings in the revolving disc to which the scoops are attached, and in so doing they compress the material so that the water is effectually squeezed out. In addition there is some gravity drainage while the rotating disc carries the material around to the discharge plow, whose circular shape serves to further squeeze, drain and dry the material before it is discharged.



Dewatering machine with rotating disc

The volume of fines and grading of the dewatered product can be varied to suit the requirements, by raising or lowering the overflow weir and/or by varying the speed of rotation of the combined disc and scoops. If an excess of fines or dirt is present in the material fed to the tank, fresh water is introduced through the tank bottom to assist in removing and discharging the excess along with the water over the overflow weir.

This device was first described in Rock Products, August 27, 1932, by John J. Zollinger, Oakhurst, N. J., its inventor. It has been much improved by the Link-Belt Co. A typical installation was illustrated on p. 40 of Rock Products Annual Review Number, January 15, 1935, at the plant of the Bellevue Sand and Gravel Co., Bellevue, Ia.

Motor-driven grab bucket

Motor Driven Grab Bucket

IMPROVED MOTOR-DRIVEN grab buckets of ½ to 3 cu. yd. capacity, which can be used for digging as well as for scooping, are offered by Erie Steel Construction Co., Erie, Penn. Since each bucket carries its own motor, it can be attached to cranes or any hoisting equipment at which electric power is available. Special teeth can be attached to the cutting lip for hard material. Either an alternating or direct-current motor can be used in the bucket head.

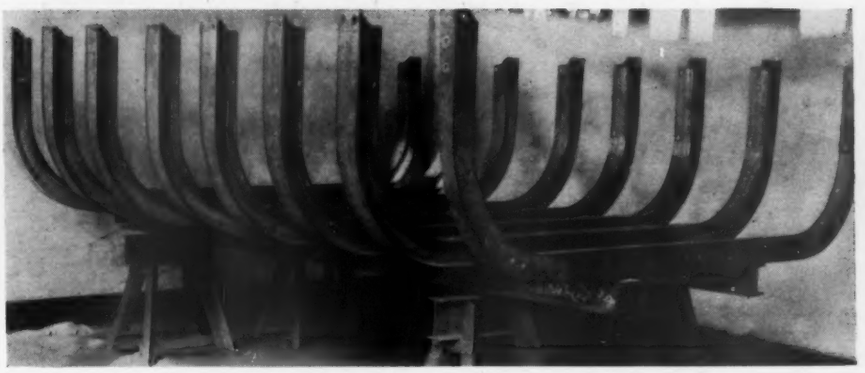
Light Structural Shapes Incorporated in New Model Truck Bodies

EASTON CAR AND CONSTRUCTION CO., Easton, Penn., makes use of structural steel shapes in the building of heavy-duty truck bodies. An important feature in the method of construction used by this company is the bending of the structural shapes to conform to the wide "U" shaped cross-section called for in their new model GE body. The structural shapes used for this purpose are 4-in. stanchions, 10 lb. per ft., rolled by the Bethlehem Steel Co. and classed as "light sections." The object of the following discussion will be to point out the improvements obtained in this new body and briefly describe the method employed in its construction.

The Easton company has for years specialized in the construction of truck and railroad car bodies, for service in shovel-loading operations. This type of service calls for a strongly built body that will withstand not only the strains of heavy loading but also the impact stresses due to the sudden dropping of large dipper loads of rock or other excavated material. In order to stand up under such heavy-duty requirements, the bodies formerly built at the Easton plant were of unusually heavy construction and were especially designed for quarry service. In recent years, however, there has been an increasing demand among contractors on earth and rock excavation work for a body of lighter weight than the above mentioned design and yet of stronger construction than the truck bodies available on the market before the introduction of the new model GE body. This new body is especially designed to meet the requirements desired for such work. The accompanying photographs illustrate the construction of the finished body.

Courtesy Bethlehem

New model body raised for dumping



Courtesy Bethlehem

Cradle beams riveted to undersills

At present the new models are being built in capacities ranging from 6 to 15 cu. yd. (heap capacities), depending on the type of operation, size of shovel, size of truck chassis, capacity of tires, etc. It is probable that in the future bodies of this type design will be built to an even wider range of capacity.

When compared with the common square cross-section type of truck body it is seen that the capacity-weight ratio of the new model is considerably higher, due to the elimination of the side bracing members. Such bracings are always required in square cross-section bodies that are employed in shovel loading operations. Moreover, as these bracing members frequently needed repairing, due to their breaking or coming loose from the body, their elimination in the new model has also brought about a noteworthy decrease in maintenance cost. The curved inner surface of the new body has another advantage in that the material being hauled dumps easily from the body, as there are no corners along the sides to which freezing or sticky material might cling.

The framework for all the trucks built at the Easton plant had formerly been constructed chiefly of I-beams. As in other structural shape installations, however, the present selection of a lighter section has permitted a more economical design and a closer spacing of the members. Furthermore, the light stanchions, when bent to the desired shape, are ideal for use as cradle beams in truck bodies.

The 4-in. stanchions are received from the Bethlehem Steel Co. in full lengths. The first step in the body construction consists in forming the cradle beams to shape. This requires the forging of 90 deg. curved bends in the 4-in. stanchions.

These bends are hot-forged by machinery using special dies made of welded plate. To insure accuracy, the bend is made separately for each end of the beam. Special "snake-blocks" are employed to maintain the original cross-section shape while the bending operations are being performed.

Holes for all riveting requirements are next punched and the cradle beams are then ready for riveting to the two under-sill beams. Bethlehem 5-in. 18.9-lb. stanchions are used for the undersills. An accompanying photograph shows how this assembly is made. The outer rib construction is thus made up of light section stanchions, with the exception of the front cradle beam, which is a special car channel.

The curved body plates are next riveted to the cradle beams. A "sandwich" type floor, consisting of a 2-in. layer of oak, covered with heavy liner plates, is then installed over the body plates.

Other features in the body construction are the tail gate and protective plate construction over the cab. The tail gate drops automatically when the body is elevaed for dumping and closes when the body is lowered again. The body front-end plate is extended upward and outward to protect the cab and driver during loading.

This type of body has only been on the market for a little over a year, but the following service account is an example of the high degree of satisfaction it has given its users. The particular truck on which a record was kept was in actual service for a year, being employed on double and triple shifts, amounting to over two years of ordinary service. A 4-yd. power shovel was employed for the excavating and loading operations. Measurements between opposite ends of all the cradle beams, taken at the beginning and at the end of this period of time, were found to be exactly the same, thus showing that the beams had not sprung in the least.

New Insulation

LAYTEX, a new insulation which the manufacturers believe promises to revolutionize the electrical industry, was recently announced by the United States Rubber Co., New York, N. Y. They claim that this product has greater flexibility, tensile strength and resistance to compression than any other known flexible insulation, and that it has the highest dielectric strength and insulation resistance, and that thinner and superior walls are possible. Laytex is derived directly from the milk of the rubber tree and the insulation is put on the wire in the liquid state. The company has patented processes for the removal of proteins, sugar and water solubles—the materials which are said to break down ordinary insulation.

THE INDUSTRY

New Incorporations

Hardin Gravel Co., Silsbee, Texas; capital $20,000. Incorporators are Holmes Duke, Sr., Leslie Jarrett and Ben F. Shipley.

Bell Stone Co., Pineville, Ky.; capital $10,000. Incorporators are Robert Maxwell and James H. Jeffries.

Independent Sand Co., Tampa, Fla.; 50 shares, $100 par value. Incorporators are E. R. Jahna, N. E. Jahna and L. H. Hill.

Orshek and Christensen, Cedar Rapids, Neb.; to deal in gravel; $5000. Incorporators are Francis R. Orshek and Paul Christensen.

Portsmouth Mixed Concrete, Inc., Portsmouth, Ohio; $5000. Incorporators are Samuel E. Frowine, Henry H. Bayerl, Ralph E. Frowine.

The Osborne and Marsellis Corp., Montclair, N. J.; crushing stone; $125,000 preferred, 2500 shares common, no par. Agent. Howard Crawford.

Anunsen Co., Salem, Ore.; sand and gravel business; capital stock, $10,000. Incorporators are Paul B. Wallace, F. S. Anunsen and Joseph H. Albert.

Remington Stone and Gravel Co., Remington, Ohio; $100,000—$100 par value common stock. Incorporators are James L. Radabaugh, Ada Radabaugh and Marion Radabaugh.

Big Rock Stone and Material Co., Little Rock, Ark.; changing capital stock to 2150 shares of 6% preferred stock with a par value of $100 and 3063 shares of common stock without par value.

Brookfield Sand and Gravel Co., Inc., Brookfield (P. O. Wauwatosa), Wis.; to deal in sand, gravel and cement; 250 shares at $100 each. Incorporators are H. F. Zirwes, W. M. Harden, G. Zirwes.

Arkansas Black Marble Co., Batesville, Ark.; 3000 shares, no par value. Incorporators are R. C. McAlister, Springfield, Mo.; Dene H. Coleman, S. M. Casey, George J. Terry and others, Batesville.

Fall River Granite and Crushed Stone Corp., Fall River, Mass.; $5000; 50 shares $100 each. Incorporators are Arthur J. Murphy, 1043 N. Main St., Fall River; Angelo R. Cummings and Yvonne B. Blanchette.

Consumers Sand Co., Topeka, Kan.; $25,000. All but five shares of the stock is held by the "bondholders' protective committee," composed of Balfour Jeffrey, Clayton Kline and M. F. Cosgrove. The remaining five shares are apportioned one share each to Robert Russell, F. C. Clark, Balfour Jeffrey, Clayton Kline and M. F. Cosgrove.

Obituaries

George C. Dent, superintendent of the Redwood City, Calif., plant of the Pacific Portland Cement Co., died March 14 after a short illness. He is survived by a widow and a married daughter.

Lawrence Hitchcock, in years gone by a prominent figure in the lime industry, died April 17 at his home in Cleveland, Ohio. At the time of his death he was president of the Distillata Co. In the early 1900's he was an officer of the Kelley Island Lime and Transport Co., and in 1915 he organized the Federal Lime and Stone Co. He was 59 years old and is survived by a widow and three young children.

Personals

Fred Schieber of the International Cement Corp. plant at Montevideo, Uruguay, who was a recent visitor at his former home in Bonner Springs, Kan., has been transferred to the company's plant in Brazil.

W. H. Eldridge of the Universal Atlas Cement Co., Hudson, N. Y., recently gave a talk on the manufacture of cement before the Rotary Club of Port Jervis, N. Y., illustrating his talk with moving pictures.

B. F. Morris, former president of the Pioneer Sand and Gravel Co., Seattle, Wash., and later with the George Scofield Co., contractors, is now general manager of Galbraith & Co., building material dealers, Seattle.

D. C. Addicks and his hobby and present avocation as a gunsmith were the subject of an illustrated story in a recent Sunday edition of the *Atlanta* (Ga.) *Journal.* Mr. Addicks is a former master mechanic of the National Cement Co.'s plant at Ragland, Ala.

A. W. Robinson, cement plant engineer, Oliver United Filters, Inc., Chicago, Ill., has gone to the Argentine to superintend the installation and starting up of American cement slurry filters at the plant of the Cia. Sudamericana de Cemento Portland, Cordoba, Argentina.

H. J. Russell, treasurer and general manager of the Jointa Lime Co., Glens Falls, N. Y., is celebrating his 41st anniversary with the company. He is also president and general manager of the F. W. Wait Lime Co., Glens Falls. The *Glens Falls Times* of April 11 contains a very complimentary article on Mr. Russell's business associations.

Cement

Lone Star Cement Co., Kansas, Bonner Springs, resumed operations April 1.

Olympic Portland Cement Co., Bellingham, Wash., plans to resume operation in May.

Medusa Portland Cement Co., Bay Bridge, Ohio, resumed operation the middle of April.

Consolidated Cement Corp., Fredonia, Kan., resumed operations the first week in April.

Marquette Cement Manufacturing Co., Cape Girardeau, Mo., resumed operations April 15.

Wolverine Portland Cement Co., Coldwater, Mich., resumed operation the latter part of April.

Universal Atlas Cement Co., Northampton, Penn., recently purchased three new No. 7 oval-bag dust collectors.

Lehigh Portland Cement Co., Mason City, Ia., plans to resume operation early in May, according to local reports.

Glens Falls Portland Cement Co., Glens Falls, N. Y., resumed operation April 15 after the winter shutdown.

Alpha Portland Cement Co., Cementon, N. Y., resumed operations early in April, after several months' shutdown.

Lehigh Portland Cement Co., New Castle, Penn., resumed operation April 22 after a shutdown since early last fall.

Manitowoc Portland Cement Co., Manitowoc, Wis., resumed operation the first week in April at two-thirds normal capacity.

Dewey Portland Cement Co., Dewey, Okla., resumed normal operation April 15. During the winter shutdown, numerous improvements were completed.

Southwestern Portland Cement Co., Osborn, Ohio, suffered the wrecking of an expensive casting recently imported from Germany in order that thieves might avail themselves of bearings valued at $35.

Aberthew and Bristol Channel Portland Cement Co., Ltd. (Great Britain), recently secured an order for 50,000 tons of cement for the Kut Barrage, Iraq. Delivery is to extend over three years.

North American Cement Corp., Catskill, N. Y., resumed full operations the middle of April. Announcing resumption of operations, G. A. Witte of the company emphasized to local newspaper reporters that continuity of operation this year depends largely on New York state highway construction, which in the last two or three years has been greatly curtailed by diversion of highway funds.

Sand and Gravel

L. C. Sumner, Buhl, Idaho, has purchased gravel pit on the Mitchell ranch.

American Gravel and Sand Co., Selma, Ala., reported installing new equipment.

Standard Portland Cement Co., Painesville, Ohio, resumed operations early in April.

South Dakota state cement plant, Rapid City, S. D., resumed operation the first of April.

West Jefferson Sand and Gravel Co., London, Ohio, will install a railroad connection with the C. & L. E. railroad.

Ashland, Ohio, county commissioners have leased seven acres of the Drushel farm with the expectation of removing 70,000 to 80,000 cy. yd. of gravel.

Huntington, Ind.: The city has leased a gravel pit on the Henry Reust farm west of the city to produce aggregate for bridge over Clear Creek. The lease calls for a royalty payment of 10c a ton. It is alleged that the gravel costs about 13c per cu. yd., with the use of FERA labor.

Fond du Lac, Wis., county highway commission has leased a portable crusher from the Bark River Bridge and Culvert Co. to produce its own aggregates. Chairman of the county highway commission, M. V. Adkins, is quoted in a local newspaper as stating: "The gravel industry is under a federal code and code prices are considerably higher than the county has been accustomed to pay."

Crushed Stone

Bozeman, Mont.: County has purchased Story stone quarry across the river from Logan.

Polo, Mo.: Grant township board has purchased a new portable crusher for highway improvement.

Pueblo, Colo.: County commissioners plan to operate a limestone quarry near Beulah for highway stone.

Holton, Kan.: The city has purchased a new portable crushing plant for supplying stone for city streets.

Mexico, Mo.: Audrain County court has purchased a new portable crushing plant to supply highway stone.

Seneca, Kan.: Each of the three county commissioners is operating a county crushing plant for highway work.

Rochester, Minn.: Two new limestone quarries have been opened by the county agent to produce agricultural limestone.

Auburn, Neb.: A new quarry has been opened on the Keedy farm west of Auburn to furnish rock for Missouri river revetment.

Dodge Center, Minn.: Dodge county has established a new limestone crushing plant to furnish agricultural limestone to farmers at 75c a ton.

Washington, Iowa, city council has made a 5-year lease on the quarry on the Wilson farm south of the city, to supply material for city streets.

Durham, N. C.: Four portable crushers are being used by the local highway district to crush field stone for highway work. In 1934, it is said, 16,500 tons of this kind of stone was used.

Bern, Kan., county commissioners, under supervision of L. P. Price, county engineer, are reopening the Mergenmeier quarry three miles south of Seneca, to supply road surfacing material.

Quartzite Stone Co., Lincoln, Kan., has a contract to produce filter stone for the Hays sewage disposal plant and is negotiating with the Union Pacific Railroad to build a spur to its quarry.

Stone Mountain Granite Corp., Atlanta, Ga., filed a petition of voluntary bankruptcy in the federal district court, listing liabilities of $30,244 and assets of $167,762. Hal Lindsay, former assistant United States attorney, was appointed receiver.

Caldwell, Ohio: Noble county commissioners plan to open five stone quarries in Jefferson, Marion, Beaver, Jackson and Sharon townships, to be worked with FERA labor.

Burlington, Iowa: Lee county commissioners are planning to open two new quarries this summer for county road work.

Manufacturers

The Carbide and Carbon Chemicals Corp., New York, N. Y., announces that its new plant at Whiting, Ind., was placed in operation in March.

Babcock & Wilcox Co., New York, N. Y., announces that Horace T. Potts Co., Philadelphia, Penn., has been appointed distributor of seamless, stainless steel pipe for the Philadelphia territory.

Riehle Bros. Testing Machine Co., Philadelphia, Penn., has become a part of **American Machine and Metals, Inc.,** New York, N. Y. Abbott F. Riehle will continue as general manager, with offices in New York, N. Y.

Worthington Pump and Machinery Corp., Harrison, N. J., announces that Ray L. Howes has joined its organization as field manager of the eastern oil power division, with headquarters in New York City. Mr. Howes was formerly with the Diesel Sales Division of Fairbanks-Morse & Co. at St. Louis and Chicago.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., announces the election of George H. Bucher as vice-president of the company. Mr. Bucher is also president and general manager of the Westinghouse Electric International Co., and has been connected with the Westinghouse organization since 1909.

Patterson Foundry and Machine Co., East Liverpool, Ohio, announces that Oliver F. Redd has joined its research department. Mr. Redd is a graduate of the University of Illinois and the University of Chicago and was for several years engaged in developing engineering work for the Bell Telephone Co. laboratories at Chicago.

Caterpillar Tractor Co., Peoria, Ill., announces that Frank E. Blanchard, formerly manager of sales in the southeastern states for the Climax Engineering Co., Clinton, Iowa, has joined its organization as a member of the special sales department. Mr. Blanchard also at one time served as assistant chief engineer and sales engineer in the industrial division of the Buda Co., Harvey, Ill.

E. I. du Pont de Nemours & Co., Wilmington, Del., announce that John W. McCoy, general manager of the explosives department, has been elected a member of the company's board of directors, vice-president, and member of the executive committee. Edward B. Yancey succeeds him as general manager of the explosives department. Both men originally joined the company as chemists in the explosives department.

Robert W. Hunt Co., engineers, Chicago, Ill., announce the election of James C. Ogden, former vice-president in charge of the company's eastern and foreign activities in New York, to succeed former President C. B. Nolte, who has been elected president of the Crane Co., Chicago; also the promotion of F. M. Randlett, Pacific Coast manager, to vice-president and general manager of the company at Chicago. M. H. Merrill will become Western manager at San Francisco.

Ajax Flexible Coupling Co., Westfield, N. Y., announces that Wm. T. Shaler, formerly with S. Howes Co., Silver Creek, N. Y., has joined the company at Westfield as engineer in charge of the development of the Shaler shaker. Clifford E. Broome, formerly engineer with Wm. Ganschow, Chicago, Ill., and more recently with Gears & Forgings, Inc., Cleveland, Ohio, has joined the organization at Westfield as engineer in charge of the Lectrigear division.

Link-Belt Co., Chicago, Ill., announces that R. Y. MacIntyre, former representative in Memphis, Tenn., has been transferred to the company office in Dallas, Texas, where he will assist E. G. Wendell, local manager. The company also announces the appointment of R. G. Moeller Co., Detroit, Mich., as distributor of crawler shovels, cranes, draglines and locomotive-type cranes. Announcement is made of the removal of the Link-Belt Portland, Ore., warehouse from Front Ave. to 14th Ave. and Savier St., to provide facilities for carrying a more complete line of conveying and power transmitting equipment; the Portland sales office will be located at 1637 N. W. 14th Ave.; D. L. Shirley is resident manager.

Bucyrus-Erie Co., South Milwaukee, Wis., announces that it has moved its New York office to the 36th floor of the RCA building in Rockefeller Center. The following staff constitute its eastern sales organization: J. C. Alexander, manager; R. W. Conant, F. Leslie Jones, W. W. Goetz, E. G. Lewis, R. J. Breslin, G. E. Peterson, G. L. Harman and T. A. Billings. The company also announces the appointment of Louisiana Tractor and Machinery Co., Inc., Baton Rouge, La., as Loadmaster distributors for the state of Louisiana.

Asphalt Institute, New York, N. Y., at a recent meeting reëleected B. L. Boye as president. Mr. Boye is with the Socony-Vacuum Oil Co. Other officers elected were: vice-presidents, A. M. Maxwell, Standard Oil Co. of Ohio; Leroy M. Law, Shell Petroleum Corp.; J. A. Blood, Standard Oil Co. of California, and T. M. Martin, Lion Oil Refining Co. of Arkansas. W. W. McFarland, president of the Warner Quinlan Co., was reelected secretary and Henry Spencer, Standard of New Jersey, was reëlected treasurer. The board of directors renamed C. W. Bayliss, Barber Asphalt Co., to be chairman of the executive committee. J. E. Pennybacker continues as managing director.

New York Belting and Packing Co., Passaic, N. J., announces the promotion of Harry H. Raber as assistant to the general manager. J. W. Webster has been transferred from the middle Atlantic states to the territory comprised of Tennessee, Alabama, Florida and Georgia. Donald F. Potter has been added to the sales force to take over part of Mr. Webster's territory in Delaware, Maryland, Virginia, North Carolina and Southern Pennsylvania. John V. Lanahan has joined the sales organization and will be located in the territory of Michigan, Indiana, Illinois, Iowa, Southern Ohio, Southern Wisconsin and Eastern Missouri. O. L. Wall has been assigned to sales work in the Pacific Coast states.

White Motor Co., Cleveland, Ohio, announces that R. F. Black, recently elected president, will assume his duties May 1. Before his election to the presidency of the White company, Mr. Black was president of the Brockway Motor Truck Corp. He was at one time vice-president of the Mack-International Motor Truck Corp. The following are the other executives elected: T. R. Dahl, executive vice-president and secretary; George H. Kelly, vice-president and treasurer; G. F. Russell, vice-president in charge of sales; H. K. York, vice-president, public works division; and S. G. Crilly, comptroller. Regional vice-presidents are Saunders Jones, New York City; G. A. Urquhart, San Francisco, Calif.; C. B. Cowan, Atlanta, Ga.; and H. E. Seanor, Chicago, Ill.

Trade Literature

Screens. A circular illustrates type 400 screen, Ty-rod screen, wire screen, scrubber, shaker, tester and dryer. W. S. TYLER CO., Cleveland, Ohio.

Pumps. Type U centrifugal pumps are described and illustrated in a leaflet. WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

Explosive. "Introducing 'Nitramon.'" Is an illustrated feature article in the April issue of *The Du Pont Magazine.* Nitramon is also the feature of the March *Du Pont Explosives Service Bulletin.* E. I. DU PONT DE NEMOURS & CO., Wilmington, Del.

Crankcase Analyses. Technical Bulletin 40S discusses deductions relative to sludging. ACHESON COLLOIDS CORP., Port Huron, Mich.

Placer Machines. Swivel feeding conveyor type placer machines are described in a leaflet. Specifications are included. IOWA MANUFACTURING CO., Cedar Rapids, Iowa.

Crushers. Type TY reduction crushers are introduced as a "little brother" to Type TZ reduction crushers in Circular 1001. TRAYLOR ENGINEERING & MFG. CO., Allentown, Penn.

Federal Projects. An excellent review of federal dam projects, with illustrations and maps, is given in Vol. IX, No. 1 of "The Groundhog." MARION STEAM SHOVEL CO., Marion, Ohio.

Motor Price Wheel. Two fiber discs about 8 in. in diameter are so printed and put together that they tell frame sizes and list prices of 448 different electric motors. LOUIS ALLIS CO., Milwaukee, Wis.

Measurements. Operating cost control through the use of measuring devices for temperatures, flows, liquid levels, etc., is suggested in a broadside. BROWN INSTRUMENT CO., Philadelphia, Penn.

Cleaning Machines. A new centrifugal blast cleaning machine which cleans various size and shape castings without the use of compressed air is described in a 4-page bulletin. PANGBORN CORP., Hagerstown, Md.

Zinc Powder. "Metallic Zinc Powder in Industrial Paint" is the title of a booklet on paint as a primer and finishing coat for iron, steel and galvanized surfaces. NEW JERSEY ZINC CO., New York, N. Y.

Erosion Control. Bulletin 1383, 16 pages, is a timely, interesting discussion of soil erosion control, with descriptions of equipment used in terracing. AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Ill.

Mixers. The "Typhoon" portable power mixer, which comes in seven standard sizes in both direct drive and geared models, is described in illustrated leaflet. PATTERSON FOUNDRY AND MACHINE CO., East Liverpool, Ohio.

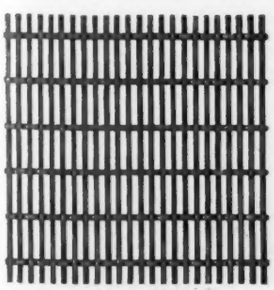
"Caterpillar" Products. A condensed catalog gives construction features, application data, specifications, and lists of attachments for tractors, blade graders, terracers and other machinery. CATERPILLAR TRACTOR CO., Peoria, Ill.

Shovel-Crane-Dragline. The new "American Gopher" Model 350, ½-yd. crawler type shovel-crane-dragline for gasoline, electric, or Diesel operation is described in an 8-page booklet. AMERICAN HOIST & DERRICK CO., Saint Paul, Minn.

Rubber Goods. A 96-page catalog, bound in leatherette, gives data and formulas on everyday problems about hose, belting, packing and miscellaneous mechanical rubber products. NEW YORK BELTING AND PACKING CO., Passaic, N. J.

Drills. An 8-page bulletin describes a new 55-lb. rock drill, L-9. A 32-page catalog describes a new line of plus portable 2-stage air cooled compressors in 4 sizes—105 cu. ft., 160 cu. ft., 210 cu. ft., and 315 cu. ft. SULLIVAN MACHINERY CO., Chicago, Ill.

Diesel Engines. A comprehensive range of Diesel engines, showing some special applications, is shown in 16-page booklet. Overleaf P. 90A, giving schedule of manufactures, accompanies booklet. THE ENGLISH ELECTRIC CO., LTD., London, W. C. 2, England.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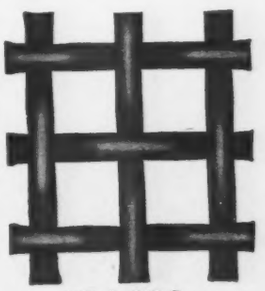
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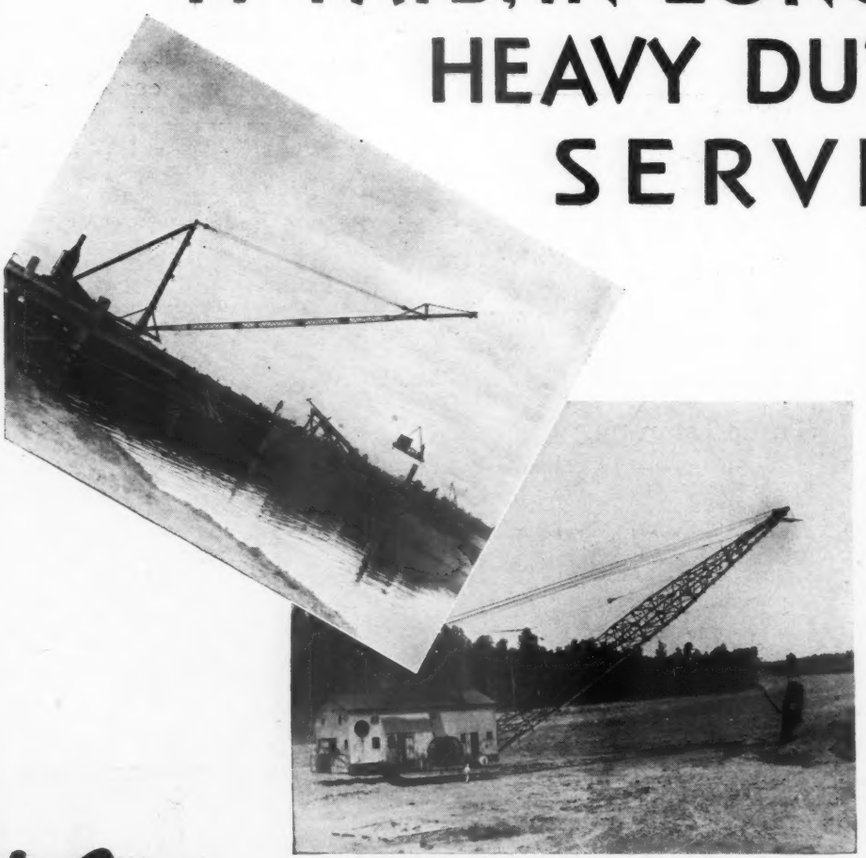

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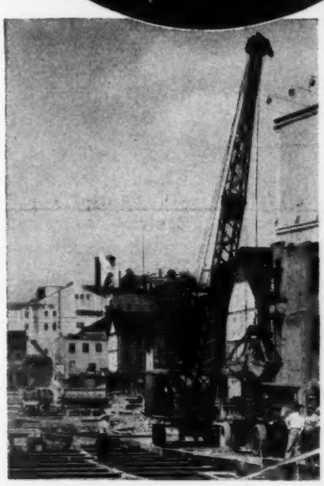
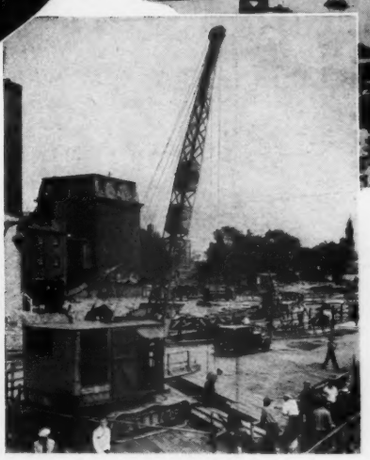
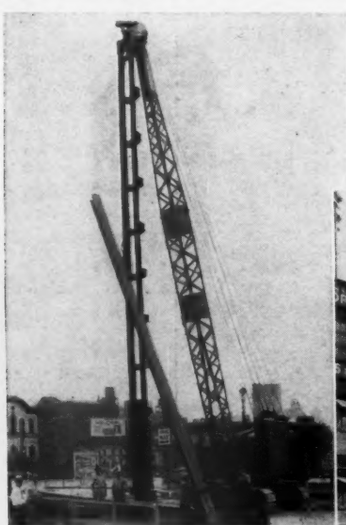




BUILDING THE APPROACHES AND SUBWAYS FOR PHILADELPHIA-CAMDEN HIGH-SPEED LINE » » »

Contractors, engaged in the construction of the subways and approaches for the High-Speed line of the Philadelphia-Camden Bridge — chose Koehring Equipment, to reduce costs and increase production.



KOEHRING HEAVY DUTY

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

Acetylene Welding Rod
American Steel & Wire Co.

Agitators, Thickeners and Slurry Mixers
F. L. Smidth & Co.

Air Compressors
Chicago Pneumatic Tool Co.
Fuller Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
Worthington Pump & Machy. Corp.

Air Filters
Fuller Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.

Air Tool Hose
Worthington Pump & Machy. Corp.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Company
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Bags
Chase Bag Co.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
Lorain Steel Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co., Division of National Equipment Corp.

Batchers
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
United States Rubber Co.

Bin Gates
Chain Belt Co.
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Robins Conveying Belt Co.
Traylor Eng. & Mfg. Co.

Bins
Austin-Western Road Machy. Co.
Traylor Eng. & Mfg. Co.

Blasting Machines
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Timken Roller Bearing Co.

Boilers
Combustion Engineering Corp.
Babcock & Wilcox Co.

Boots and Shoes
United States Rubber Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Dragline and Slackline)
Bucyrus-Erie Co.
Sauerman Bros.
Wellman Engineering Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Wellman Engineering Co.

Bulldozers
Koehring Co., Division of National Equipment Corp.

Cableways
American Steel & Wire Co.
General Electric Co.
Link-Belt Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Sauerman Bros.
Williamsport Wire Rope Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Cars (Dump)
Lorain Steel Co.

Car Pullers
Link-Belt Co.
Robins Conveying Belt Co.

Carriers
Barber-Greene Co.

Cars (Quarry and Gravel Pit)
Austin-Western Road Machy. Co.
Lorain Steel Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Chain Belt Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chutes and Chute Liners
Cross Engineering Co.

Chutes for Minimizing Segregation
Robins Conveying Belt Co.

Classifiers
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co.
Macwhyte Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Austin-Western Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Chicago Pneumatic Tool Co.

Compressors (See Air Compressors)

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co., Division of National Equipment Corp.

Conveyor Idlers and Rolls
Barber-Greene Co.
Chain Belt Co.
Link-Belt Co.
Robins Conveying Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Barber-Greene Co.
Chain Belt Co.
Fuller Company
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
United States Rubber Co.

Cranes (Clamshell)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co., Division of National Equipt. Corp.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.
Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
Link-Belt Co.

Cranes (Excavator
Koehring Co., Division of National Equipt. Corp.

Cranes (Gantry)
Industrial Brownhoist Corp.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
Pennsylvania Crusher Co.

Crushers (Hammer)
Austin-Western Road Machy. Co.
Dixie Machy. Mfg. Co.
Pennsylvania Crusher Co.
Lorain Steel Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc. (Jaw))
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Crushers (Reduction)
Bonnot Company

Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
New Holland Machine Co.
Traylor Eng. & Mfg. Co.

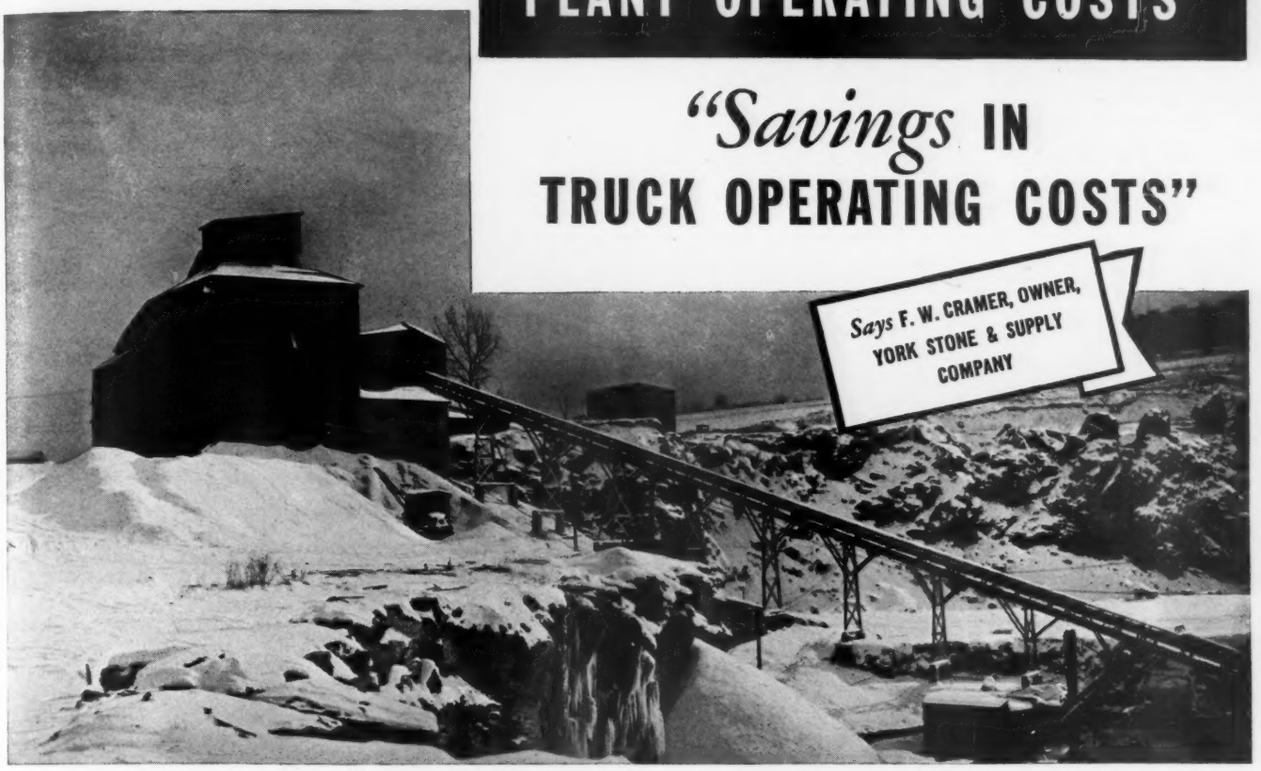
Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

GENERAL VIEW of the plant of the York Stone & Supply Co. at York, Pa., where Gulf lubricants have made outstanding savings in maintenance and operation costs.

"Savings IN PLANT OPERATING COSTS"

"Savings IN TRUCK OPERATING COSTS"



Leading Rock Products Plants Reduce Operating Costs by IMPROVED LUBRICATION.

"IN THE 15 YEARS we have used Gulf lubricants we have effected considerable saving in the operation of our plant as well as our automotive equipment. We use Gulf products 100%"—that statement by Mr. F. W. Cramer, Owner of the York Stone & Supply Co., is of real significance.

Lower maintenance and operating costs *invariably result* from the use of Gulf lubricants in rock products plants. The Gulf engineer works with your plant men to secure the most efficient operation from each piece of equipment by improved lubrication practice. Gulf's complete line of quality oils and greases permits the selection of exactly the right type of lubricant for each moving part. If you are not using Gulf products, give them a trial.

GULF REFINING COMPANY, Pittsburgh, Pa.

District Sales Offices: Boston • New York • Atlanta
Philadelphia • New Orleans • Houston
Pittsburgh • Louisville • Toledo

THIS BRIEF TREATISE has been prepared to help rock products plants analyze their maintenance and lubrication costs. Your copy is ready.

GULF INDUSTRIAL LUBRICATION

GULF REFINING COMPANY R. P. 5
3800 Gulf Building, Pittsburgh, Pa.

Please send me without obligation, the booklet "Lubrication Cost Recording."

Name.....
Title.....
Company.....
Address.....

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Diaphragms (Pump)
United States Rubber Co.

Dippers and Teeth (Steam Shovel)
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co., Division of National Equipt. Corp.

Ditchers
Barber-Greene Co.
Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co., Division of National Equipt. Corp.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Dragline Excavators (Walking)
Bucyrus-Monighan Company

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Morris Machine Works

Dredging Sleeves
United States Rubber Co.

Drill Bits
Timken Roller Bearing Co.

Drill Steel
Worthington Pump & Machy. Corp.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Blast Hole)
Worthington Pump & Machy. Corp.

Drills (Diamond Core)
Chicago Pneumatic Tool Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Chicago Pneumatic Tool Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

Dumptors
Koehring Co., Division of National Equipt. Corp.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.

Dust Conveying Systems
Fuller Company

Dust Hoods and Helmets
Pulmosan Safety Equipment Corp.

Dynamite
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Electric Cables and Wires
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Engineers
Bonnot Company
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Chicago Pneumatic Tool Co.
Nordberg Mfg. Co.
Worthington Pump & Machy. Corp.

Engines (Gasoline, Kerosene and Oil)
New Holland Machine Co.
Worthington Pump & Machy. Corp.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co., Division of National Equipt. Corp.

Excavators (Dragline)
Koehring Co., Division of National Equipt. Corp.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Fans
General Electric Co.

Fans (Exhaust)
Jeffrey Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Jeffrey Mfg. Co. (Pan and Tube)
Schaffer Poidometer Co. (Weighing)
Smith Engineering Works (Plate)

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Gaskets
United States Rubber Co.

Gasoline
Texas Company

Gears and Pinions
Chain Belt Co.
General Electric Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Lorain Steel Co.

Grizzlies
Jeffrey Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Eng. & Mfg. Co.

Hammer Drills
Chicago Pneumatic Tool Co.

Hammer Mills (See Crushers)

Hoists
Chicago Pneumatic Tool Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Chicago Pneumatic Tool Co.
United States Rubber Co.

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
United States Rubber Co.

Loaders and Unloaders
Barber-Greene Co.
Bucyrus-Erie Co.
Fuller Company
Jeffrey Mfg. Co.
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Diesel-Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Electric)
Jeffrey Mfg. Co.

Locomotives (Gas Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Oil Electric)
The Fate-Root-Heath Co.
Plymouth Locomotive Works

Locomotives (Steam, Gas and Electric)
General Electric Co.
Plymouth Locomotive Works (Gas)

Locomotives (Storage Battery)
General Electric Co.
Jeffrey Mfg. Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Gulf Refining Co.
Macwhyte Co. (Wire Rope)
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Magnets
General Electric Co.

Manganese Steel Castings
The Frog, Switch & Mfg. Co.

Mechanical Rubber Goods
United States Rubber Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Lorain Steel Co.
F. L. Smidth & Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Concrete)
Koehring Co., Division of National Equipt. Corp.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.
Harnischfeger Corp.

Nitramon
E. I. du Pont de Nemours & Co., Inc.

Nozzles (Gravel Washing)
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Packings (Pump, Valve, etc.)
United States Rubber Co.

Paint (Asphalt)
Texas Company

Pavers (Concrete)
Koehring Co., Division of National Equipt. Corp.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

GRINDING MACHINERY

UNI-KOM
KOMINUTER
PYRATOR
UNIDAN
TUBEMILL
TIRAX

For GRANULATING and PULVERIZING
WET or DRY

Reduce Your Grinding Costs by Installing Modern Grinding Equipment

●

F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Plates (Double Corrugated)
Hendrick Mfg. Co.

Poidometers
Schaffer Poidometer Co.

Portable Compressors
Worthington Pump & Machy. Corp.

Portable Conveyors
Barber-Greene Co.
Fuller Company
Link-Belt Co.
Robins Conveying Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.
Hercules Powder Co.

Power Transmission Machinery
Chain Belt Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Jeffrey Mfg. Co.
New Holland Machine Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Bucyrus-Erie Co.
Morris Machine Works
Worthington Pump & Machy. Corp.

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons

Railway Equipment
General Electric Co.

Railways (Electric)
General Electric Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Chain Belt Co.

Respirators
Pulmosan Safety Equipment Corp.

Road Machinery
Barber-Greene Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

Screens
Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Lorain Steel Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co., Division of National Equipt. Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Company

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.

Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Sprockets and Chain
Chain Belt Co.
Jeffrey Mfg. Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Tires and Tubes
United States Rubber Co.

Track Equipment
Lorain Steel Co.
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Kansas City Hay Press Co.
Koehring Co., Division of National Equipt. Corp.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
Macwhyte Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trenchers
Barber-Greene Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
United States Rubber Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

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PUBLISHER'S STATEMENT OF CIRCULATION

This is to certify that the average circulation per issue of ROCK PRODUCTS for the six months' period July 1st to and including December 31st, 1934, was as follows:

Copies sold	3461
Copies distributed free	2018
Total	5479

(Signed) NATHAN C. ROCKWOOD, President.

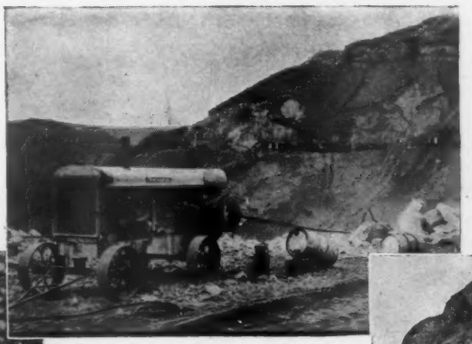
Subscribed to and sworn before me on this 27th day of April, 1935.
(Notary's Seal) FRANK A. KUNTZ.

WORTHINGTON ROCK MASTER Performs at Grand Coulee

IN THE HARDEST BLUE GRANITE ever encountered by old time "hard rock" men...the Rock Master averaged 10 feet of hole per hour against a 2-foot maximum by ordinary drills.

. . . and in tough "tombstone" granite, 15 to 18 feet of hole per hour.

The Rock Master not only drills faster, but its easy portability saves valuable moving time.



"This blue granite is the hardest rock I ever struck in a lifetime of drilling" said the drill superintendent on the job. It was in this material that the Rock Master averaged 10 feet of hole per hour.

THIS Worthington Portable Compressor supplied the air for the Rock Master... and a couple of the conventional hand drills at the same time... AND KEPT THEM GOING.

Get the details before you tackle your next rock job

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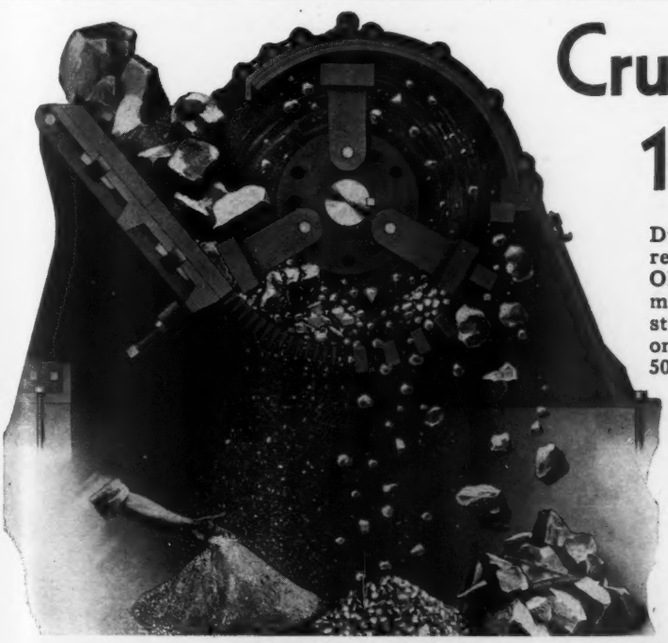

Crushes 36" Rock to 1¼" in One Operation

Due to their ability to handle power shovel loaded rock and reduce to commercial sizes in ONE OPERATION WITH ONE CRUSHER, Williams Hammer Crushers have shown remarkable savings in many quarries. By handling the large stone much sledging and secondary blasting is avoided. As only one crusher is required there is a saving in investment of 50% to 75% as you also save in smaller buildings, fewer foundations, conveyors, drives and motors. A cubular product free from slivers and slabs is another Williams advantage. Let us tell you about a Williams for your work. A size for every job. Capacities 3 to 300 tons per hour.

Williams Patent Crusher & Pulverizer Co.

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Chicago	New York	San Francisco
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THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK REG. U.S. PAT. OFF.

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

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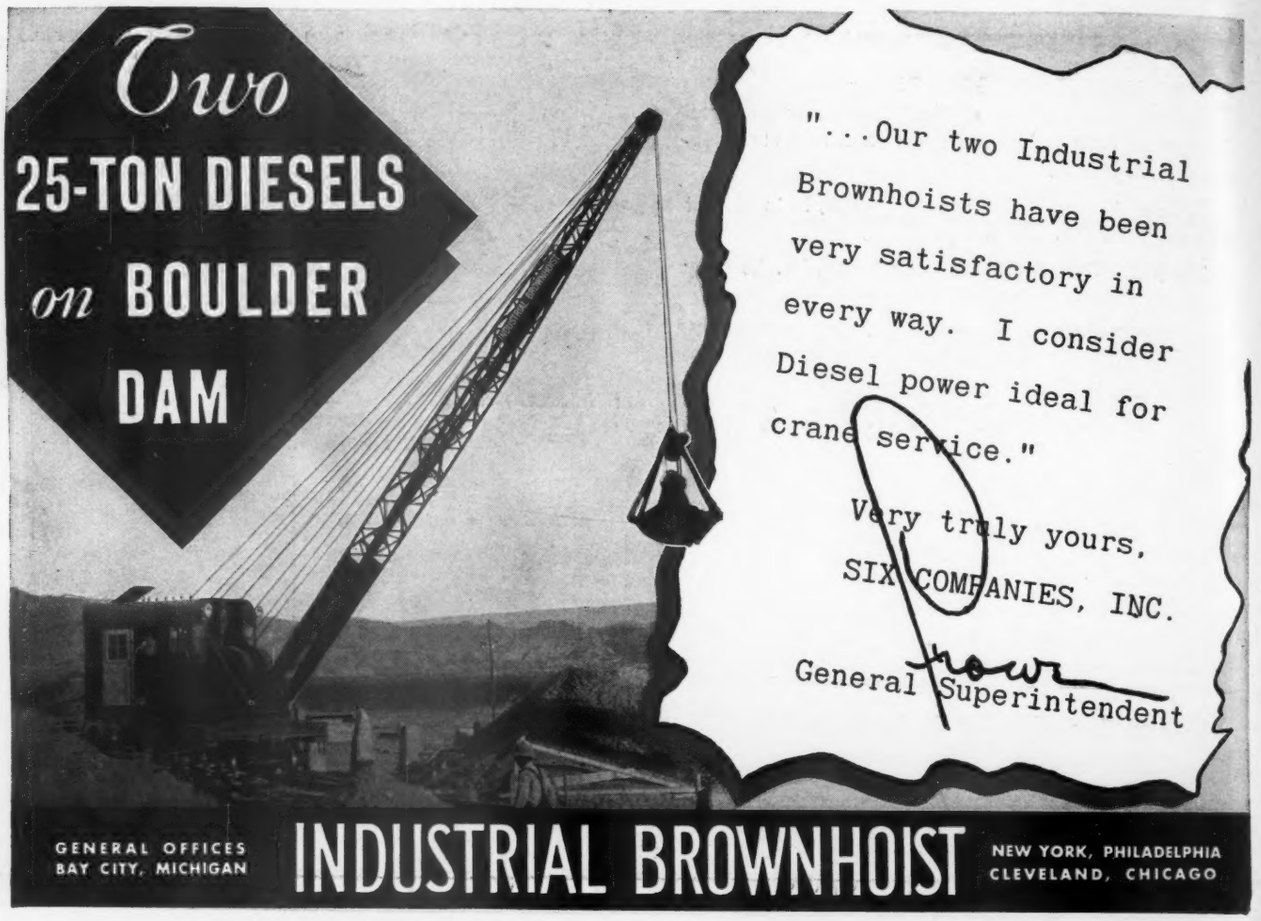
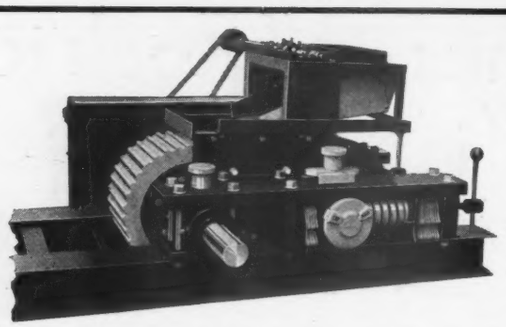
PATENT CRUSHERS GRINDERS SHREDDERS





New Holland Roll Crushers for chips, sand, etc. All sizes and combinations to suit requirements.

New Holland Heavy-Duty Vibrating Screens. All standard sizes in one, two and three decks.

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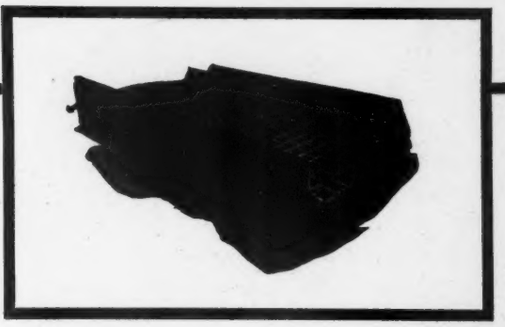

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FROM DOUBLE CORRUGATED PLATE

To push production up to your maximum capacity, use the greater tumbling action of Hendrick Double Corrugated Heat-Treated High Carbon Plate.

This greater tumbling action sends the particles trying for size—hence very little undersize goes over—and the net result is a cleaner, more effective screening job.

Write for complete data.

HENDRICK MANUFACTURING CO.

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Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

New Steel Resists Abrasion

LASTS MANY TIMES LONGER

Send Coupon for Bulletin→

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Ryerson Abrasion Resisting Steel is low in price and can be advantageously used in many places. Let us send you complete data. Just fill in the coupon—no obligation of course.

Joseph T. Ryerson & Son, Inc. Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Philadelphia, Buffalo, Boston and Jersey City.

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Joseph T. Ryerson & Son, Inc. Lock Box U, Chicago, Ill.
Send bulletin on Ryerson Abrasion Resisting Steel. ☐
Indicate application below for further facts and figures.

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● Above, No. 1838 Primary Breaker, designed for tremendous strength, Best roller bearings available. Large capacity. Other crushers: 920, 1220, 1520, 940, 440.

● No. 3018 Roll Crusher, specially designed bearings inside the roll on fixed shaft for maximum support without bearing strain.

● A crushing and screening plant can be no more efficient than its crushing units. Austin-Western Portable plants offer great advantages, but many fixed plants can be greatly improved by installation of Austin-Western Crushers (two of which are shown here). Quarry superintendents and other producers are urged to set themselves up now for a trouble-free season. Send the coupon for details on crusher units or complete plants.

The Austin-Western Road Machinery Co.
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Send details on ☐ complete Austin Western Plants
☐ No. 3018 Roll crusher ☐ No. ..... Primary Breaker.

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ROAD ROLLERS, CRUSHING & SCREENING PLANTS, SCARIFIERS, SWEEPERS & SPRINKLERS, ROAD GRADERS, ELEVATING GRADERS, MOTOR GRADERS, DRAGS, SHOVELS, DISTRIBUTORS, WAGONS, SNOW PLOWS.

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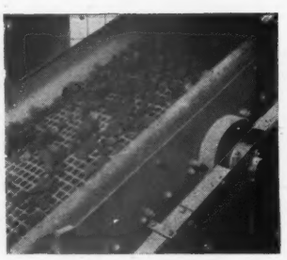
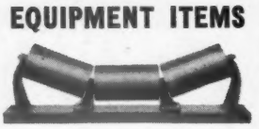
The man with the best product gets the business today. The buyer of sand, gravel and stone is taking an unprecedented interest in cleanness and uniformity now that the matter of price is no longer an issue. His attitude, however, is a blessing in disguise for the necessary equipment to produce clean product naturally saves the producer in production, power and maintenance costs. A Robins engineer will gladly call and make a survey of your plant and suggest how to bring it up-to-date either in one fell swoop or by a series of easy improvements that will be justified by savings in production. This service is gratuitous . . . send in the coupon today.



EQUIPMENT ITEMS



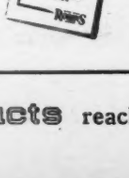
Conveyor Idlers
Screens
Conveying Belts
Bucket Elevators
Bin Gates

Robins Screens and Material Handling units and complete installation are described in literature that will be sent on request.

MATERIAL HANDLING ROBINS EQUIPMENT

ROBINS CONVEYING BELT CO.,
15 Park Row, New York City.

I would be pleased to have as checked. Representative call ( ). Gyrex Screen Book ( ). Equipment Bulletin ( ).



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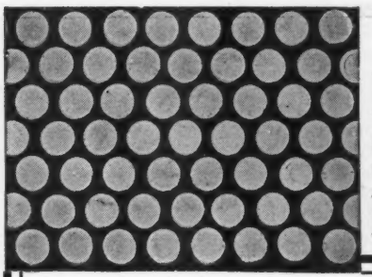

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Durable—accurate and available in a large variety of sizes in round, square, oval and diagonal slot perforations.

MORROW SCREEN PLATES have for years given the utmost in service satisfaction in the sizing and preparation of coal, sand, gravel, stone and other bulk material.

Our experience as specialists in screening machinery is your guarantee of absolute satisfaction. Deliveries are always prompt.

Ask for our literature.

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Industrial Brownhoist Buckets are built in capacities of from 1/2 to 15 yards, for rehandling or excavating service.

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INDUSTRIAL BROWNHOIST
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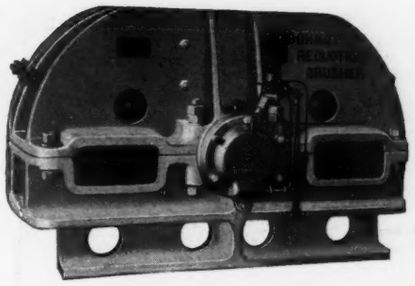
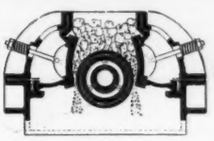


BONNOT

REDUCTION CRUSHERS



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Cast Steel Frame . . . . . Bronze Sleeve Bearings
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Positive Pressure Lubrication . Cast Iron Safety Plates

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can be increased through the higher efficiency—increased capacity and substantial economy effected by the BONNOT Reduction Crusher. The BONNOT Reduction Crusher is designed and built by experts whose leadership dates back nearly half a century. Only the best of wear-resisting material is used throughout. Those interested will be furnished with actual data regarding power and lubrication savings—maintenance costs—performance in crushing various aggregates, etc.

We are always glad to cooperate in solving your crushing problems. There is no obligation—write.

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MULTI-WALL

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PAPER SHIPPING SACKS

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There is solid satisfaction in the character, serviceability and appearance of these strictly up-to-date Paper Shipping Sacks.

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Established in 1847

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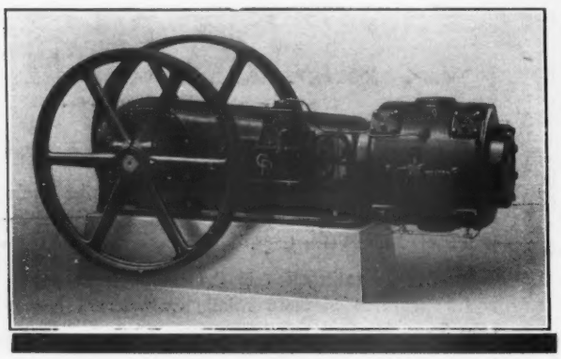
TYPE T HORIZONTAL SINGLE-STAGE AIR COMPRESSOR

Double-acting; water-cooled; arranged for belt and direct-connected motor drive; for permanent and semi-permanent installation; capacities from 89 to 1293 cu. ft. per min.



A PROMISE . . . FULFILLED

New . . . modern . . . smoothly "streamlined" . . . Type T Compressor gives outward promise of the high efficiencies within . . . a promise that is generously fulfilled by such salient features as:

- SIMPLATE VALVES
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- DOUBLE-COUNTERWEIGHTED CRANKSHAFT
- COMPLETELY ENCLOSED FRAME WITH OIL-TIGHT AND DUST-PROOF COVERS

How and *why* these and other features of the Type T Air Compressor contribute to its high operating efficiency, its long life and its low maintenance cost, are fully described and illustrated in Bulletin No. 728. Send for your copy . . . today.

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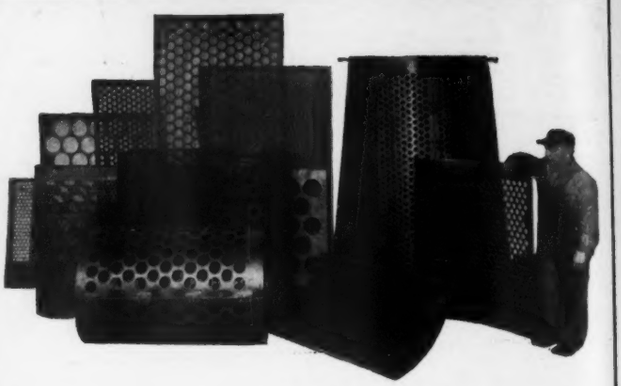
6 EAST 44th STREET NEW YORK, N. Y.
Manufacturers of
AIR & GAS COMPRESSORS
ROCK DRILLS
DIESEL ENGINES
ELECTRIC TOOLS
PNEUMATIC TOOLS
VACUUM PUMPS & CONDENSERS

SCREENS of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

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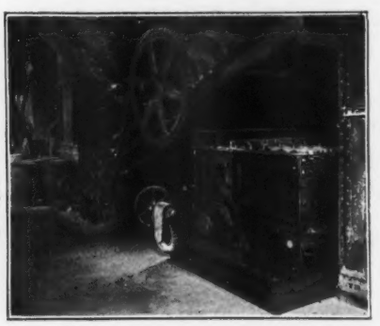
5650 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

"PENNSYLVANIA" *STEELBUILT*
SINGLE ROLL CRUSHER and HAMMERMILL



preparing "Easywork" Lime from R.O.K. Lump.

"Pennsylvania" *STEELBUILT* Primary and Secondary Crushers of the Single Roll, Hammermill and Jaw types are specialized for the preparation of Limestone for Stack and Rotary Kilns, for Cement Making, for Aggregate, and for Road Material.

Unbreakable Steel Construction
Positive Tramp Iron Protection

PENNSYLVANIA CRUSHER COMPANY
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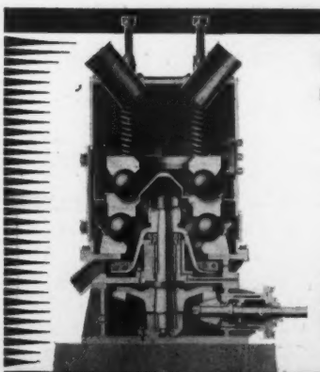
Branches in principal cities.

Put Your Reduction Problems Up to Us.



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THE BABCOCK & WILCOX COMPANY · 85 LIBERTY ST. · NEW YORK
BABCOCK & WILCOX

Pounds of them in fact—our Rosie being a South African beauty who believes the hardware, while slowing her up and shortening her life, looks good.

Screens hampered by equally senseless, profit-eating gadgets, have no place in today's production schedules or economic plans. This is one of many reasons why experienced operators choose the Late Model UNIVERSAL Super-Vibrators with their large capacity—low-power consumption and minimum upkeep. The UNIVERSAL is designed for profitable production—not false flash. With minimum parts and maximum capacity the UNIVERSAL would be a good buy at a much higher price,—yet it is the most reasonably priced screen on the market.

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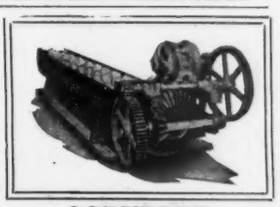
UNIVERSAL VIBRATING SCREEN CO.

RACINE - - WISCONSIN

Why ship dirty stone when it can be made clean easily and ecomically?



SCRUBBER

This scrubber will do the good work.

State Capacity Required!

LEWISTOWN FOUNDRY & MACHINE CO.

Mfrs. of SandCrushing, Grinding, Washing and Drying Machinery

LEWISTOWN - - - - - PENNA.

McLANAHAN PRODUCTS

Single, Double Roll Crushers—Super Dry Pans—Steel Log Washers and Scrubbers—Dryers—Jigs—Screens—Hoists, Elevators and Conveyors—Reciprocating Feeders, Bingates, Chutes, Turn Tables, Elevator Buckets, Car Pullers, Rail Straighteners, Cast Parts, Rough or Finished—Car Wheels and Brake Shoes, Sprockets and Sheaves, Gears and Bearings, Gratings and Columns, Chute Linings, Grate Bars of Special Heat-Resisting Metals.

Write for catalogues listed or for information concerning any of the material, machinery and castings listed, required in mine, quarry or pit.

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Manufacturers—Founders—Machinists

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PULVERIZERS

The BRADLEY GRIFFIN MILL (3 sizes)
The BRADLEY 3-ROLL MILL
The BRADLEY PNEUMATIC MILL
The BRADLEY HERCULES MILL

Unexcelled for the Reduction of
LIMESTONE
CEMENT CLINKER
AGRICULTURAL LIMESTONE
ASPHALT FILLER
Rock for
MINE DUSTING
or any
DRY REFRACTORY MATERIAL
where a
Finely Ground
FINISHED PRODUCT
Is Desirable.

Capacities:
1 to 50 Tons per Hr.

Finenesses:
20 to 350 Mesh

and the

1935 MODEL BRADLEY AIR CLASSIFIER

"Turbulator Equipped"
Patented
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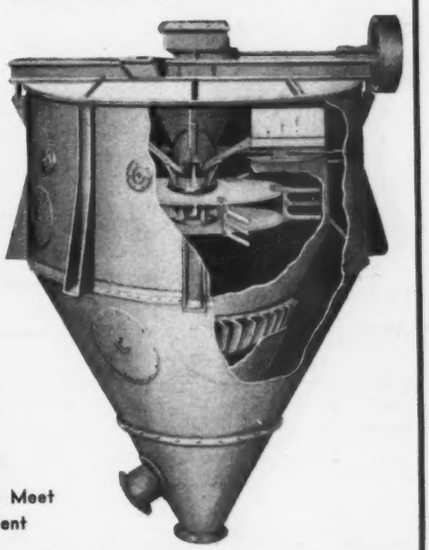
OUTSTANDING
because of

Sturdy Construction
Large Outputs
Low Power and Low Maintenance Costs
Uniform Product and Simple but Highly Effective Flexible Adjustments
Built in Sizes to Meet Any Requirement



Investigate this New Model Air Classifier. Its great efficiency and ability to make a superior classification of fine particles is amazing.

Our Engineering Service Is at Your Disposal for Planning or Estimating Any Job in the Pulverizing Field.

BRADLEY PULVERIZER CO.

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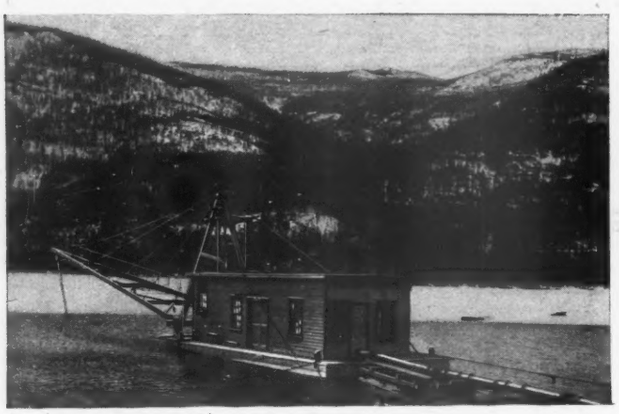
Works: ALLENTOWN, PA.

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



Getting down to the bottom of things . . . .

Lifting solid material in a suction pipe 110 ft. against the well-known law of gravity is no small achievement, but a Morris Dredge is doing the job profitably in recovering mine tailings from the bottom of a lake. It is just another instance of how Morris Dredges have developed a reputation for handling any kind of dredging job successfully. Sand and gravel producers and dredging contractors, please take note.

A glutton for punishment . . . .

This Morris Centrifugal Pump doesn't seem to know—or care—that it is operating on particularly severe service. Anyone would assume that those accumulations of gritty slurry shown in the picture would find their way into the bearings or stuffing box, to say nothing of cutting through the sealing rings and grinding down the impeller. The owner writes: "We are pumping an acid slurry with a high percentage of abrasive solids, but all of our Morris Pumps deliver more than the guaranteed capacity with no additional power consumption. We are glad to recommend Morris Slurry Pumps to anyone requiring a rugged, wear-resisting and efficient unit."

If you want to know more about these pumps, just write for Bulletin 135.

For authoritative recommendations on any pumping or dredging problem, address Morris Machine Works, Baldwinsville, N. Y.
Export Office: 30 Church St., New York City.

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by the U. S. BUREAU of MINES for Type A Dusts
Under Schedule 21

The new M-15 Dust Respirator, officially approved for safety—fit—comfort, is now available at a most attractive price. Order one for trial. Get details. Pulmosan Safety Equipment Corp., 176 Johnson St., Brooklyn, N. Y.

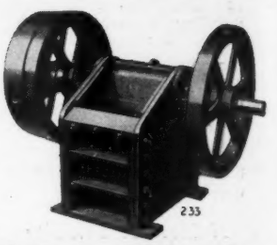
PULMOSAN M-15 DUST RESPIRATOR

Ehrsam Crushers

Roll Jaw Type

A full series from 8"x12" up. Plain bearings and roller bearings. Can be furnished mounted on trucks with or without elevator and power.

Elevating, Conveying and Power Transmission Machinery, Screens and Scrubbers, Complete Plaster Mills.



The J. B. Ehrsam & Sons Mfg. Co.
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Chicago Rep.: W. H. Kent, 431 South Dearborn Street

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featuring—
Unusually Comfortable Rooms, Good Food, Carefully Prepared, and Rates from $2.50 Single

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RADIO IN EVERY ROOM

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An Exclusive Winter Resort Hotel

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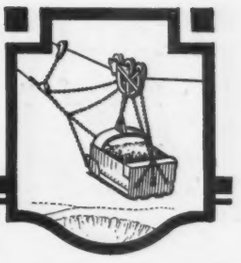
SAUERMAN
LONG RANGE MACHINES



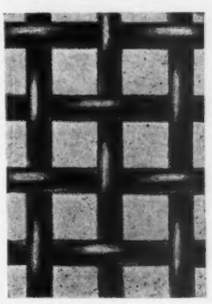
DRAG SCRAPERS SLACKLINE EXCAVATORS

POWERFUL, economical machines are these Sauerman Drag Scrapers and Slackline Excavators. They are able to span an area 1,000 ft. or more in width and convey materials from any point in this area at a rapid rate. One man handles the entire operation.

The sizes of Sauerman machines range from portable units for small pit operations up to huge machines with capacities of 600 tons per hour. There is a special type for underwater excavation, another for digging from a bank, another for storing and reclaiming, and so on. Tell us your problem and we will mail you a booklet describing the type of machine that meets your requirements.

SAUERMAN BROS., 430 S. Clinton Street, Chicago

NATIONAL SPECIAL
"NAT-ALOY"



Wears five times as long as cloth made of ordinary steel.
Withstands vibration without crystallization.
Super-tough to resist abrasion.
Maintains accuracy throughout life of screen.
Has outworn other special alloy cloths.

ATTRACTIVE PRICES
STOCK SHIPMENTS

National Wire Cloth Co.
ST. PAUL, MINN.

Write for new catalog

WILFLEY Centrifugal SAND PUMP
PATENTED
for Slurry
for Sand Tailings

ELIMINATION of stuffing box has done away with many troubles common to centrifugal pumps.

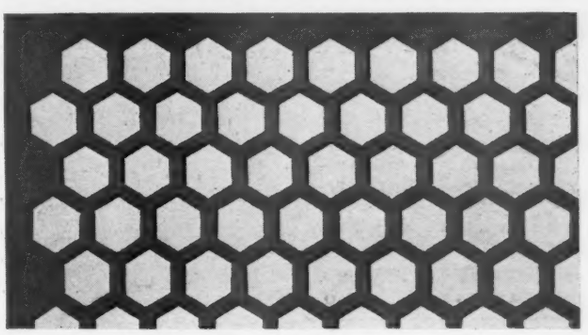
Pump maintains extraordinary efficiency.

Pumping parts unusually heavy, insuring long life. Cleaning out pump or changing wearing parts requires only a few minutes.

Described and illustrated in Catalog No. 8

A. R. Wilfley & Sons, Inc., Denver, Colo., U. S. A.
New York Office: 1775 Broadway

HEXCREEN
IS YOUR BEST BET



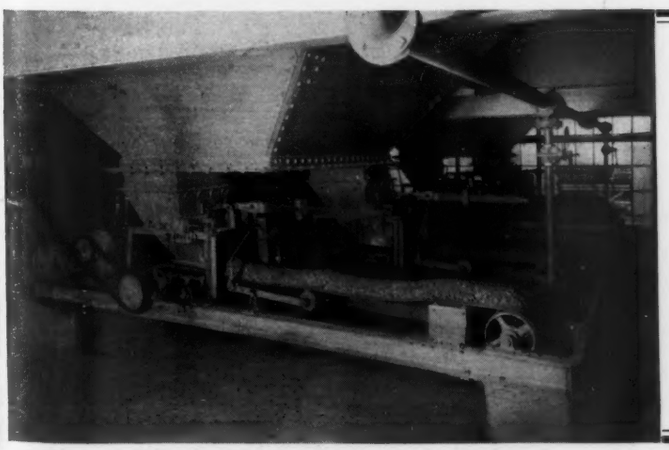
The Cross Hexcreen is the logical answer to your sizing problems. It combines capacity with maximum accuracy. It has all the advantages of round and square perforations without the disadvantages of either.

The Hexcreen cuts your screening cost while delivering a product of higher quality. Let us send descriptive literature which by means of diagrams shows just how and why the Hexcreen is your best bet.

We manufacture Cylindrical Screen Sections, Conical Screen Sections, Vibrating Screen Plates, Shaker Screen Plates, with Round, Square, Slot or Hexcreen Holes in Straight Rows or Staggered, Plain or indented.

CROSS

CROSS ENGINEERING CO.
Manufacturing Plant and General Offices
CARBONDALE, PA.
Sales Representatives in Principal Cities



99% ACCURATE

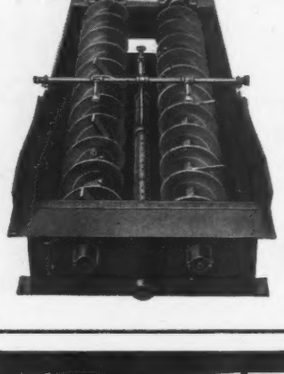
SCHAFFER POIDOMETERS are guaranteed to be not less than 99% accurate in the weighing and proportioning of material. They are automatic in action, self-contained and operate on a continuous basis. However, where batch operation is desired, our mechanical weigh-master attachment upon being set for a predetermined amount, causes the machine to stop when this amount has been delivered.

Our illustration shows a Battery of Poidometers Proportioning Raw and Finish Material at Birmingham, Alabama, Plant of Alpha Portland Cement Co.

Write for Catalogue No. Two.

SCHAFFER POIDOMETER CO.
2818 Smallman St. PITTSBURGH, PA.

EAGLE WASHERS



Single and Double
Spiral Screw and Log Type

Guaranteed removal of trash, sticks, leaves, coal, silt, mud-balls,—to the difficult clay-balls and iron oxide conglomerates.

EAGLE IRON WORKS
Des Moines, Iowa

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.
2427 to 2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

LIGHTNING

Heavy-Duty (Ball-Bearing) Sand and Gravel **PUMPS**

High efficiency—low operating cost — precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads.

WRITE.

KANSAS CITY HAY PRESS CO.
KANSAS CITY, . . . MO.

MANGANESE STEEL CASTINGS

for the
Rock Products Industry

On Your Next Inquiry Specify
"INDIAN BRAND"
Known For Its Superior Shock and Wear Resisting Qualities.

The Frog, Switch & Mfg. Co.
Established 1881 Carlisle, Pa.

PRODUCE HIGH STRENGTH
AND ALL TYPES OF MASONRY

CEMENTS
by the new process!

Inquiries invited from producers of cement, lime and allied products.

CEMENT PROCESS CORP.
P. O. Box 515 Mexico City, Mexico
All processes patented in U. S. and other countries.

Good Roads MACHINERY

CHAMPION ROLLER-BEARING ROCK CRUSHERS
CHAMPION & CLIMAX PRIMARY ROCK CRUSHERS
FEEDERS—ELEVATORS—CONVEYORS—SCREENS
BINS—WASHING EQUIPMENT—COMPLETE PLANTS

GOOD ROADS MACHINERY CORP.
KENNETT SQUARE PENNSYLVANIA.

HAYWARD BUCKETS

WON'T QUIT
OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

DIXIE NON-CLOG HAMMER MILLS

Make the most of 1935 and the years to follow by installing these large capacity crushers wherever there is a tough reduction problem to be met economically. The DIXIE handles material direct from the quarry no matter how wet or sticky, without clogging the feed. The special moving breaker plate gives twenty-six times the wearing area of any standard type of breaker plate. Reduces material to any uniform given size in a single operation. 40 sizes for any capacity—Primary—Secondary or Fine Reduction. Write.

DIXIE MACHINERY MFG. COMPANY
4209 Goodfellow Ave. St. Louis, Mo.

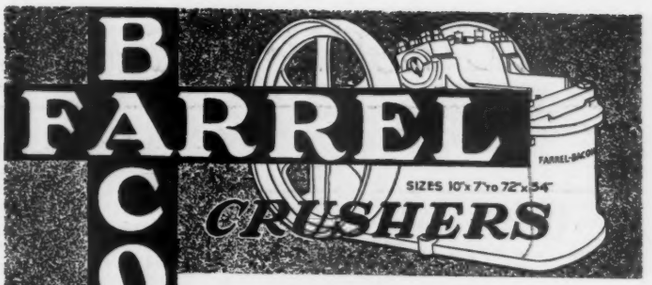
WILLIAMS BUCKETS

The Crane-Time Savers!

Williams Power-Arm, Multiple-Rope and Dragline Buckets are digging demons. Output speaks loudly in their favor. **Write for Bulletins.**

THE WELLMAN ENGINEERING CO.
7008 Central Ave., Cleveland, Ohio

BACON



Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 JOHN STREET NEW YORK, N. Y.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

FOR SALE

All Equipment Now in Place in Large Quarry Located, Joliet, Illinois.
All Items Now Being Offered at Consistently Low Prices, Including:

30" McCully Gyratory, Tex Rope Drive to 150 HP. Slip Ring Motor.
16-A Telsmith Primary Gyratory.
3-F Telsmith Reduction Crusher.
4' Symons Cone Crusher, direct connected.
9 Ton Whitcomb Gasoline Locomotive, 46" Ga., Climax Engine.
7 Ton Whitcomb Gasoline Locomotive, 46" Ga., Waukesha Motor.
25 Ton American Saddle Tank, Std. Gauge.
18 2 Yd. Quarry Cars, 46" Ga., Steel Bodies.
24" Allis-Chalmers Bucket Elevator, 70'.
20" Bucket Elevator, 68' Centers
36" Bucket Elevator, 66' Centers
20" Belt Conveyor, 22' Centers.
22" Belt Conveyor, 32' Centers.
48"x20' Austin Rotary Screen.
40"x16' Austin Rotary Screen.
12" x 12" Gardner Air Compressor, 75 HP. G. E. Slip Ring Motor.
173 CFM Ingersoll-Rand Belted Compressor.
2 18-B Bucyrus Steam Shovels.
Gardner-Denver Drill Tower complete.
6" x 8" Dayton-Dowd 2-Stage Centrifugal Pump, cpld. 4-cyl. Gas Engine.
24" diameter x 30" Face Single Drum Heavy Duty Friction Hoist.
10 Ton American All Steel Stiff Leg Derrick,
25 Jack Hammers and Drifters.
Drill Sharpener complete.
100 Tons of 60 and 50 lb. Rail.

Ready for Shipment from Our Chicago Warehouse

Nos. 36 and 42 American Ring Pulverizers.
No. 3 Williams Heavy Duty Hammer Mill.
54" x 40' Direct Heat Rotary Dryer.
6, 8, 10, 12" Amsco Sand and Gravel Pumps.
9x8, 9x10, 10x10, 12x10, 14x12, Belted Air Compressors.
6, 8, 10 Ton Tandem Gasoline Locomotives.
¾, 1, 1½ and 2 Yd. Sauerman Cableways.
½, ¾, 1, 1¼, 1½, 2, 4 and 6 Yd. Sauerman Drag Scraper Outfits. Also extra Buckets.
150, 180 HP. Full Diesel Engines.
Send for complete Stock List covering Cranes, Shovels, Draglines, Crushers, Screens, etc.

MACHINERY SALES CORP. OF AMERICA
565 W. Washington Blvd.
Chicago, Illinois

DUMP CARS

33—WESTERN 5-yard 36" gauge, heavy duty, 2-way side dump cars.

75—WESTERN 4-yard 36" gauge, heavy duty, 2-way side dump cars.

LOCOMOTIVES

Four 21-ton Vulcan 4-wheel saddle tank dinkeys, 36" gauge.

Two 21-ton Porter 4-wheel saddle tank dinkeys, 36" gauge.

One 21-ton American 4-wheel saddle tank dinkey, 36" gauge.

All equipped with Code Boilers.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY

BIRMINGHAM, ALABAMA

FOR SALE

12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo.
101 West 31st St. New York

NEW DIESEL ENGINES
At One-Half Price

5—135-hp. Atlas Imperial Diesel, 6-cyl.
1—125-hp. Victor Diesel, 2-cyl.
2—80-hp. Atlas Imperial Diesel, 4-cyl.
1—65-hp. Victor Diesel.
1—50-hp. Worthington Diesel, 3-cyl.
1—45-hp. Atlas Imperial Diesel, 3-cyl.
1—12-hp. Mason Diesel, single cyl.

JOHN REINER & CO., Inc.
29 Howard St., New York City
Canal 6-0286

NEW BELTING
Cotton Woven Belt

20,000 ft. NEW Belting in original rolls, size 30" to 8" widths, 100 to 500 ft. lengths, Medium and Heavy weights. Suitable for Conveyor or Transmission. For Sale at 50% of its original manufacturing price. Send for itemized list of sizes, quantities and prices.

MARINE METAL & SUPPLY CO.
167 South Street New York City

FOR SALE

Link-Belt Shaw Classifiers
4—24 inch
2—30 inch
2—36 inch

Priced reasonable for quick sale

TERRE HAUTE GRAVEL CO.
Terre Haute, Ind.

(Classified Advertising Continued on Next Page)

CLASSIFIED ADVERTISEMENTS

Used Equipment For Sale

(Continued from Preceding Page)

1—Rex Triplex Road Pump, latest model, 35 H.P. Waukesha engine, cap. 80 gal., 500 lbs. pressure. Price ..... $ 650.00

1—180 cu. ft. Schramm Portable Air Compressor, Buda motor, late model. Price..... 1000 00

1—240 cu. ft. Sullivan Portable Air Compressor, Buda motor late type. Price 1250.00

1—310 cu. ft. Sullivan Portable Air Compressor, Buda motor, late type. Price 1550.00

1—Barber-Greene Loader, Model 42-B, like new, Buda motor, swivel spout. Price 1150.00

1—½-yd. Speeder Gasoline Crawler Crane, 35′ boom, Hercules motor, A-1 condition. Price..... 1850.00

1—Late Model P & H Backfiller, like new, telescope boom, Waukesha motor. Price..... 600.00

2—95 H.P. Waukesha Gas Power Unit, Model JK, 6½x7, 4-cyl. Price, each 900.00

2—75 H.P. Waukesha Gas Power Unit, Model JS, 5x7, 4-cyl. Price, each 750.00

Vulcan Steam Pile Hammers, 3 No. 1, 2 No. 2, 1 No. 3. McKiernan-Terry, 1 No. 5, 1 No. 6. 1 No. 7, 2 No. 9B-2.

1—No. 400, 1 No. 800 Vulcan Pile Extractors.

MERTES MACHINERY CO.
Milwaukee Wisconsin

FOR SALE

JAW CRUSHERS — 7″x11″ - 8″x14″ - 9″x15″ - 10″x16″ - 6″x20″ - 11″x22″ - 12″x24″ - 13″x30″ - 15″x30 - 18″x36″ - 20″x50″ - 28″x36″ - 30″x30″ - 26″x42″ - 36″x48″ - 42″x60″ - 56″x72″ - 36″x60″ - 66″x84″ - 42″x40″.
Crushing Rolls—16″x10″ up to 54″x64″.
Gyratory Crushers—From No. 2 up to No. 12.
No. 0-No. 1 and No. 7 ring roll mills.
No. 1—No. 1½ and No. 2 rotary fine crushers.
Swing hammer mills.
3′x25′-4′x30′-5′x50′-5½′x40′-6′x50′ and 8½′x 75′ direct heat rotary dryers.
4′x30′ - 4½′x26′ - 5′x30′ semi-indirect heat rotary dryers.
Indirect heat and steam heated air rotary dryers.
Rotary cement kilns 3′ to 8′ diameter.
Hardinge-Marcy and Fuller-Lehigh mills.
No. 1, No. 0 and No. 00 Raymond Mills.
One 6′x8′ Traylor ball mill.
5′x12′ and 4′x10′ rod mills.
Tube mills from 4′ to 6′ in diameter.
8′ and 10′ air separators.
Hummer - Sturtevant - Gyrex and Niagara screens—Motors.
Hoist—Air compressors—Cranes & Shovels.
Complete Asphalt Mixing Plants (New).

W. P. HEINEKEN
95 Liberty St., New York Tel. Barclay 7-7298

CARS

12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo. 101 West 31st St. New York

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Marion Gas Electric ¾-Yard Shovel.
1-Yd. Osgood Crawler Shovel, rebuilt.
Side and Center dump cars.
Locomotives—75-ton Switcher, code boiler —saddle tank type, 18 to 65 tons.
Cranes and Draglines, various sizes.

SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Georgia

FOR SALE

Marion Steam Shovel, Type 7, No. 6166.
Marion Electric Shovel, Type 7, No. 6114.
Porter steam Locomotive, Shop No. 6944, saddle tank, standard gauge.
Traylor revolving screen, 60″ diam. x 24 ft.
Traylor belt bucket elevator, 30″ wide, 65 ft. centers.
Clyde Lime Hydrator, Shop No. 150.
Raymond Lime pulverizer, with No. 11 Exhaust fan.
Butterworth & Lowe lime crusher.
Worthington Duplex Air Compressor, 550 cu. ft. capacity.
75 H.P. General Electric Synchronous motor, 220 volts, 1200 RPM.
Keystone Gas Well Drill.
Cyclone Gas Well Drill.
Loomis Clipper Electric Well Drill.
Howe 100-ton track scales.
Flory Single drum hoist.

YORK VALLEY LIME & STONE CO.
York, Pa.

FOR SALE

Link-Belt Chain Elevator, 12x7 Buckets, 50′.
Belt Conveyor, 24″ trough, 90′ long.
Belt Conveyor, 16″ trough, 60′ long.
Idlers, Pulleys and Belt, etc., 16 to 36″.
Acme 12″x22″ Jaw Crusher.
Reliance 8″x14″ Fine Jaw Pulverizer.
Jeffrey No. 3 Lime Pulverizer.
Ingersoll-Rand ER-1 9x8 Air Compressor.
Gasoline Engines, Air Tanks, Steam Air Compressors.
Two-Drum Electric Hoist, 25 H.P., A.C.
Gasoline Locomotives, 24-30-36″ gauge.
Light Rails, side and swivel Dump Cars. All gauges.
Centrifugal 8x6″ Pump, A.C. motor, 1000 G.P.M.
Kinney H.Q. 2½″ Jacketed Heavy Oil Pump.
Friction Drum, 15 H.P. Electric Car Puller.
¾-yd. Tip-over Buckets and 1-yd. Steel Skips.
Cyclone 10-ton Chain Hoist, 12′ lift.
3 KW 110 volts D.C. gas-Driven Generator.

G. A. UNVERZAGT — 15 Park Row, New York City

FOR SALE:

Complete Assortment New Detachable Bits and Drill Steel. Attractive Price.

R. E. BROOKS COMPANY
50 Church Street New York City

FOR SALE

1 Complete Morris 10″ Dredge with 40-ft. Swintex Ladder. Will sell all or part.

A. J. Clementz's Sons, Massillon, O.

GEORGE HAISS MFG. CO., Inc. **HAISS** 140th St. & Rider Ave. New York

Send me full details and prices on equipment checked:

FACTORY REBUILT CLAMSHELL BUCKETS
☐ 1—Haiss Rehandling 1½-yd. Bucket.
☐ 1—Blaw-Knox ¾-yd. Dreadnaught Bucket.
☐ 1—Hayward 2-yd. Round Bowl Bucket.
☐ 1—Haiss 1-yd. HiPower Digging Bucket.
☐ 1—Hayward 1-yd. Type "E" Bucket.
☐ 1—Haiss 1-yd. Contractor Type Bucket.
☐ 1—Hayward 1½-yd. Type "E" Bucket.
☐ 1—Haiss ½-yd. Digging Type Bucket.
☐ 1—Hayward 1¼-yd. Type "E" Bucket.
☐ 1—Haiss 1¼-yd. Comb. Coal and Snow bucket.

FACTORY REBUILT TRUCK LOADER
☐ 1—Haiss Creeper Type Truck Loader.

Name .....
Address .....

FOR SALE

CRANE—Link Belt 22-Ton Locomotive $1000.00
DERRICK — McMyler, 70′ Stiff Leg 1500.00
GENERATOR—General Electric 25 K.W. 500.00
HOISTS—Lidgerwood 2-Drum... 150.00
HOISTS—Lidgerwood 1-Drum... 100.00
LOCOMOTIVE—Porter 50 T. Steam 1500.00
LOCOMOTIVES—4 Westinghouse Electric without batteries, each 250.00
PUMP—Am. Mang. St. Co. 12″ Sand and Gravel W/250 H.P. motor, controls, etc. 4000.00
ROCK CARS — 47 Western and others, 3¾ and 4 yd. Each... 25.00
WEIGHING BATCHERS — 11 Blaw-Knox No. 2, 2000-lb. Ea. 100.00

MISSOURI PORTLAND CEMENT COMPANY
ST. LOUIS, MISSOURI

1,250-yd. Cummer Asphalt Plant.
18x36 Farrel B Jaw Crusher.
Pennsylvania SX4 Hammermill.
Williams No. 4 Universal Hammermill.
2-ft., 3-ft., 5½-ft. Symons Cone Crushers.
Clyde Lime Hydrator.
Raymond Size 0 Lime Pulverizer.
3,000 ft. 30-in. New Conveyor Belt.
Howe 100-ton Track Scale.
Traylor 30-in. x 60-ft. Bucket Elevator.
Keystone Gasoline Operated Well Drill.
Sanderson 14 Electric Well Drill.
Ingersoll-Rand 34 Drill Sharpener.
24-in. and 36-in. Conveyor Equipment.
18-in. 90-ft. Belt Conveyor.
650 ft. Sullivan WJ-3 Air Compressor.
550 ft. Worthington Duplex Compressor.
6-ton Universal Truck Crane.
110 ft. Ingersoll-Rand 20 Portable Compressor.

R. C. STANHOPE, Inc.
875 Sixth Ave. New York, N. Y.

1—2-yd. MARION 480 Shovel-Crane.
1—2-yd. Bucyrus 50B Shovel.
1—1¼-yd. BYERS Crane.
1—1-yd. OSGOOD Shovel-crane.
1—1-yd. KOEHRING Crane.
1—1-yd. P. & H. 600 Shovel.
1—¾-yd. P. & H. Shovel-crane.
1—½-yd. BYERS Shovel-crane.
30—4-yd. Heavy Steel Stone Skips.
1—265-ft. Gas Portable Compressor and Jackhammers.
Electric Draglines, 2- and 3-yd.
Gasoline Draglines, ½- and ¾-yd.
1—BROWNING Truck-crane.
24″ Conveyor 65 and 170 ft.
Clamshell Buckets, ½ to 1½ yd.
Crushers 10x18; 15x38; 18x30; 11x26; 12x20.

J. T. WALSH
500 Brisbane Bldg., Buffalo, N. Y.

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Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

28x36″ and 24x36″ Jaw Crushers.
No. 37 Kennedy Secondary Gyratory.
150 HP. Fairbanks-Morse Full Diesel Engine.
180 HP. Sullivan - Fairbanks - Morse Diesel Compressors.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. St. Louis, Mo.
Most anything you want—Where and when you want it.

CLASSIFIED ADVERTISEMENTS

USED EQUIPMENT

Drag Scraper and Slackline Bargains

3—½ yd. Drag Scraper outfits (gasoline powered) .....$250.00 up
1—¾ yd. Drag Scraper outfit (gasoline powered) $500.00
1—¾ yd. Slackline outfit (gasoline powered) $750.00
1—1 yd. Slackline outfit (gasoline powered) $1,100.00

Other sizes in belt and steam hoists.
S. O. Nafziger, 159 N. State St., Chicago

FOR SALE: 1½, 1⅜, 1¼, 1⅛ and 1" IMPROVED PLOW STEEL and Plow Steel, Wire Ropes; 60,000 ft. ⅞ and 1" Extra Strong; lengths 300 to 3,500 ft., adapted for DRAG LINES, DREDGING, CABLEWAYS, Slings, Guys, etc.; used slightly, but in fine condition; three 960 cubic ft. Belted Air Compressors, $375.00 each; two 200 H.P. NORDBERG FULL DIESEL HORIZONTAL Oil Engines; Two 150 and 30 H.P. Vertical Oil Engines. **PHOENIX CONTRACT CO., Winne Bldg., Wichita, Kansas.**

USED EQUIPMENT WANTED

WANTED

USED WHITCOMB GASOLINE LOCOMOTIVE 36" GAUGE ABOUT 6 TONS. WRITE TO ILLINOIS CLAY PRODUCTS CO., BARBER BLDG., JOLIET, ILLINOIS.

WANTED

An Aerial Tramway to convey rock for a distance of a mile and one-half. Address Box 674, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

WANTED

Drill Sharpener. Model 8 "Waugh" (Denver Rock Drill Mfg. Co.). No other model or make considered.

Address Box 675, care of Rock Products, 330 S. Wells Street, Chicago, Ill.

WANTED

4,000' Rubber Covered Conveyor Belt, 16 to 24" wide.

Two-Deck and Three-Deck Vibrating Screens. 20-ton Truck Scales with 9x20' platforms.

G. A. UNVERZAGT
15 Park Row **New York City**

WANTED TO BUY

a used or new Portable Screening and Washing Gravel Plant, five or eight hundred per day. Would rent one.
Ashelford Bros., Telephone 61-3, Byron, Ill.

BUSINESS OPPORTUNITIES

INDUSTRIAL PROPERTY

Wisconsin Silica Sand Plant. For Sale. Exceptional Opportunity. Complete Bldgs. & Equip. Hydraulic Pumps, Pebble Mills, Crushers, Screens, etc. Switch Track. Good Deposit. Long Royalty Lease. Address Box 673, care of Rock Products, 330 South Wells Street, Chicago, Ill.

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
35 Doane Street, Boston, Massachusetts.
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation	**Design**
Examinations	**Construction**
Reports	**Supervision**

WE LOOK INTO THE EARTH
By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM
Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

POSITIONS WANTED

CEMENT PLANT SUPERINTENDENT with 20 years' experience would like to make a connection with a cement organization. Position immaterial. Master Mechanic or Asst. Superintendent. Good mechanic, with experience covering heavy machinery, construction or operation. Wet and dry experience. Capable handling men. References in regard to character and ability. Employed at present. Address Box 671, care of Rock Products, 330 South Wells Street, Chicago, Ill.

LIME PLANT SUPERINTENDENT DESIRES a permanent connection; 20 years' experience in operating lime plants, limestone quarries, and crushing plants; also have years of experience in the burning of lime, hydration, and construction. Efficient and successful handling of equipment and labor. First-class mechanic. Experience in the clerical functions in plant costs. Excellent references. Address Box 638, care of Rock Products, 330 South Wells St., Chicago, Ill.

POSITION WANTED AS SUPT. WITH A progressive stone company; 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment, efficient handling of labor and low cost of production; qualified to assume full charge of any size plant; unquestionable reference. Address Box 654, care of Rock Products, 330 South Wells St., Chicago, Ill.

SALES AND PROMOTIONAL MAN DESIRES permanent connection with a progressive lime manufacturer. 15 years' experience. Well and favorably known among the dealers, contractors and chemical trade in Chicago and Central Illinois. Excellent references as to character and ability. Address Box 555, care of Rock Products, 330 South Wells Street, Chicago, Ill.

NOW AVAILABLE—MY SERVICES, ON either temporary or permanent basis, as Technical Consultant on Lime—covering advertising, sales promotion, process development, technical service to customers, or other problems confronting the lime industry. Address Sidney P. Armsby, 209 W. 11th St., Rolla, Mo.

LIQUIDATION! NOW UNDER WAY!

Half of Complete Plant Sold
GEORGIA MANGANESE AND IRON COMPANY
CARTERSVILLE, GEORGIA
All New 1929—Used Sixty Days

CAST IRON PIPE

1200 ft.—20" Del. Class 100
1200 ft.—16" Del. Class 150
2400 ft.—12" Del. Class 150
All Bell & Spigot, 12-ft. lengths.

Purchased new six years ago; used on clear water only; excellent condition, with valves, fittings, etc.

PUMPS

All Dayton-Dowd Bronze fitted Centrifugal type—hydraulically balanced.
2—10", 3-stage, each with 400 hp., Synchronious motor, 4000 g.p.m. at 240' head.
2—8", 3-stage, each with 200 hp., Synchronous motor, 2000 g.p.m. at 240' head.
1—6", 4-stage, size GSD-6, with 200 hp. Slip Ring motor, 1000 g.p.m. at 578' head.
2—6", 3-stage, each with 200 hp., Slip Ring motor, 1000 g.p.m. at 462' head.
6—6", 3-stage, each with 200 hp. sq. cage motor, 1000 g.p.m., 462' head.
1—6" with 50 hp. motor.
2—4", each with 40 hp. sq. cage motor, 750 g.p.m., 116' head.

Each of above pumps direct motor connected on common base, all in excellent condition; with complete starting equipment.

MOTORS

All G.E. Co. 3 ph., 60 cy., 2200 v.
2—400 hp., 1200 r.p.m. Synchronous
2—200 hp., 1200 r.p.m. Synchronous
6—200 hp., 1800 r.p.m. Type sq. cage
2—200 hp., 1800 r.p.m. Slip Ring
10—150 hp., 875 r.p.m. Slip Ring
2—100 hp., 865 r.p.m. Slip Ring
2—100 hp., 580 r.p.m. Slip Ring
2— 75 hp., 1750 r.p.m. Sq. Cage
1— 50 hp., 1730 r.p.m. Sq. Cage
1— 40 hp., 1745 r.p.m. Sq. Cage

All above Motors have serial numbers above 5,000,000.

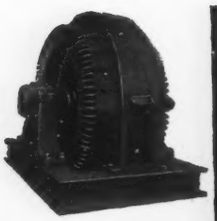
All Slip Ring Motors equipped with drum control, variable speed resistors, circuit breakers. Squirrel Cage Motors provided with CR-1034 and CR-1135 Starting Compensators, providing time element overload and under-voltage production.
1—6-panel Switchboard, complete, main switch house.

SEND FOR BULLETIN

describing other items at plant such as
1—Apron Feeder, 5'3" C/C, 60" wide, with motor and reducer.
1—205' 20" Conveyor, motor, reducer.
1—48" C/C enclosed Bucket Elevator, 14" buckets, 3/32" rubber covered belt, with motor and reducer.
1—220' Gardner-Denver portable Gasoline Compressor.
1—250-ton steel structural bin, two sec.
1—¾ yd. Thew Crawler Gasoline Shovel.
2—Shepard-Niles Traveling Cranes, 20-ton, 30' span—10-ton, 24' span, hand, chain-operated.
1—30-ton Plymouth Gasoline Locomotive.
1—27"x15' Dorr Classifier.
2—Dorr Bowl and Rake Classifiers, 20' bowls, 6'x33'4" rakes.
9—Jigs, Allis-Chalmers Woodbury, with 5 hp. var. speed motors, Texrope drives.
4—Fahrenwald Classifiers, 5-pocket.
4—Dodge Sand Dewaterers, capacity 120 t.p.h.
1—16' Allis-Chalmers Log Washer.
2—25' Allis-Chalmers Log Washers.
9—50-ton Steel Ore Cars, drop bottom.
8—6" Georgia Iron Works Dredge Pumps.
3—4'x5' No. 37 Tyler Screens, 2-deck.
1—Ruth Laboratory Rod Mill.
8—Structural Steel Buildings.

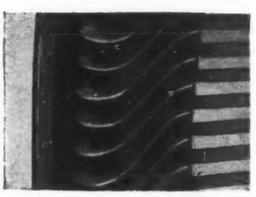
SEND ALL INQUIRIES TO

CONSOLIDATED PRODUCTS COMPANY, Inc.
(owner)
CARTERSVILLE, GEORGIA
Tel. Cartersville 4103
Representative on Premises
NEW YORK OFFICE: 15-16-17 Park Row

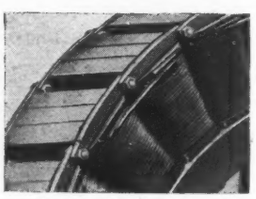


8 Big Reasons Why It Will Pay You To Select G-E SYNCHRONOUS MOTORS

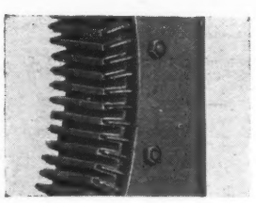
THE RIGHT SYNCHRONOUS MOTOR FOR EVERY JOB



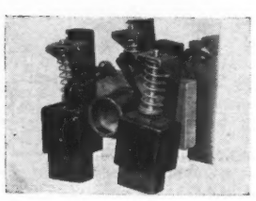
1. A special, high-quality insulation, developed in the G-E Research Laboratory, protects the windings of every G-E synchronous motor against oil, mild chemicals, abrasive materials, etc.— your assurance of long motor life and low maintenance.



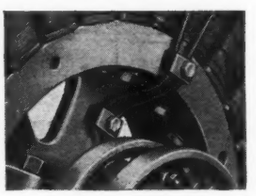
2. The bars of the starting windings are fitted into tapered holes in the end rings, and silver-soldered at red heat, thereby making permanent alloy joints that are as strong as the parent metals themselves. Result: low-resistance joints that can't become loose.



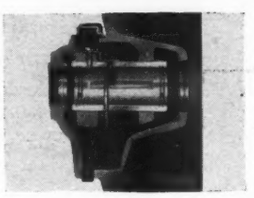
3. The stator cores of G-E synchronous motors are built up of thin sheets of high-grade silicon steel, each of which is separately annealed and enameled after punching. Result: low core losses and high efficiency.



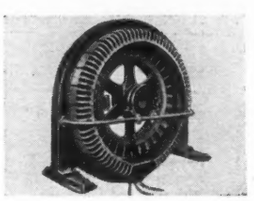
4. The one-piece box-type brass brush holders used in G-E synchronous motors apply pressure at the center of the brush in a radial direction, thereby preventing chattering or binding. Result: long brush life.



5. Heavily insulated field leads can't become loose, because they're held securely in place by clamping blocks. Wide collector rings with staggered brushes wear longer and more evenly. Result: low maintenance costs.



6. Accurately bored sleeve bearings of hard tin babbitt, with large bearing surfaces, give long, dependable service. Long, close housing fits with grease-filled grooves, protecting the bearing against water, dust, grit. Result: long life for bearings.



7. From General Electric's complete line of synchronous motors and control it is easy to select the RIGHT MOTOR and the RIGHT CONTROL for every job — a perfectly matched combination that will promote greater economy in your plant.

8. General Electric's 40 years' experience in the design, manufacture, and application of synchronous motors and control is your assurance that this equipment will give years of continuous service. General Electric, Schenectady, New York.

040-17

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